

JANUARY, 1940

# Rock Products

THE INDUSTRY'S RECOGNIZED AUTHORITY

ANNUAL PICTORIAL REVIEW NUMBER



SEASON'S GREETINGS  
FOR 1940

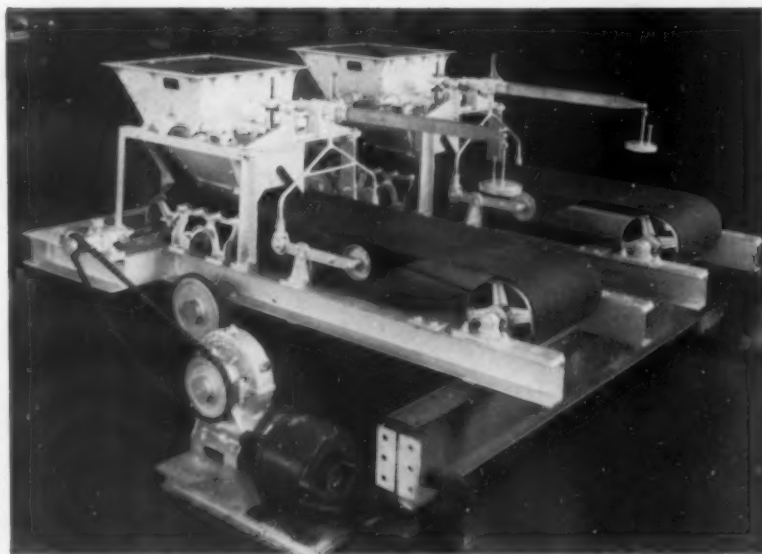
F. L. SMIDTH & CO.  
ENGINEERS

225 BROADWAY

NEW YORK



TN950  
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## SCHAFFER POIDOMETERS

### **Guarantee Exact Weights and Proportions**

99% accuracy in weighing and proportioning Stone and Clay, Gypsum and Clinker! No wonder the cement industry continues to install Schaffer Poidometers. They are saving countless thousands of dollars each year.

They are automatic in action—self-contained and operate continuously. They never forget and never make mistakes. A recording device enables operators to determine the total amount of material handled at all times.

### **FOR WEIGHING AND FEEDING COAL**

Many cement plants have installed Schaffer Poidometers for weighing and feeding coal to dryers and have made a considerable saving in fuel due to the fact that the coal is fed into the dryer by weight and not by volume.

Let us show you how you can save money on your proportioning and feeding operations.

*Write for catalog No. 2.*

**SCHAFFER POIDOMETER CO.**

2828 SMALLMAN ST.  
PITTSBURGH, PA.

GK2, B2, 49

14/11/8  
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# EIGHT WAYS TO CUT COSTS AND PRODUCE A BETTER PRODUCT



## Screening to Meet Rigid Specifications

Supplement your rotary screens with Link-Belt vibrating screens to obtain a better grading of the smaller sizes of gravel or stone. Rotary screens for better washing—vibrating screens for better sizing. The combination of both rotary and vibrating assures your ability to meet the most rigid specifications.



## Anti-Friction Belt Conveyors

Save power, assure dependability and cut down maintenance costs by replacing your old, plain-bearing belt conveyor idlers with modern Link-Belt anti-friction bearing idlers.

We manufacture all the popular sizes of belt conveyor idlers, for light, medium and heavy-duty service.



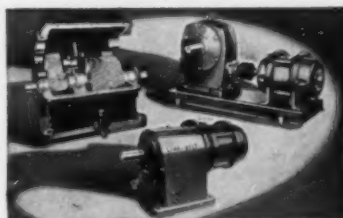
## Prolong the Life of Belt Conveyors

Conveyor belts should run practically central with their conveying or supporting idlers to avoid possibility of injury to belt edge in running against chutes, etc. When a belt does run with too much misalignment, the use of Link-Belt self-aligning idlers, spaced at intervals, corrects this condition by automatically "training" the belt to a central position.

● There are many others. Call in a Link-Belt engineer. No inquiry is too large or too small. Send for catalog.

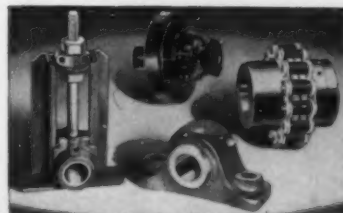
## LINK-BELT COMPANY

Chicago Philadelphia Indianapolis  
Atlanta San Francisco Toronto  
Offices in Principal Cities



## Efficient Speed Reduction

Wherever power is to be transmitted at a reduced or greater speed than that of the motor, there opportunity will be found for the money-saving use of Link-Belt reducers. Link-Belt makes three separate types — Herringbone Gear, Worm Gear and Motorized Helical Gear—as well as Silverstreak Silent and Silverlink Roller Chain Drives and Variable Speed Transmissions — to fit every power transmission need. Send for Catalogs.



## Save Power with Link-Belt Transmission Units

A complete line—self-aligning anti-friction ball and roller bearing units, newly designed for greater life... unmounted bearings for various industrial applications... babbitted bearing units for every service... welded steel base plates... take-ups... friction and jaw clutches, including the famous Twin Disc line... cast and cut tooth gears... steel split and cast iron pulleys... safety collars... couplings, both flexible and rigid... drop hangers and hanger bearings... grease fittings... shafting—the latest designs of the leading manufacturers of power transmission equipment. Send for Data Book No. 1600.



## Sand Recovery

The Rotoscoop is a perfected sand dewatering unit which is capable of recovering fine grains and discharging dry enough for truck transportation, or conveying to and from storage by belt conveyors. It is made in four sizes, 15', 12', 9' and 6' diameters, with capacities varying from 25 to 125 tons per hour.



## Screw and Flight Conveyor Units Produce a Drier Sand

The Link-Belt dewatering screw conveyor is a most serviceable and practical unit for small and medium capacities. It produces a clean and dry sand for use where specifications and inspection are rigid. By using two units in series, the coarser sands can be reclaimed for concrete and the fine for plaster.

The Link-Belt dewatering flight conveyor gives equivalent results to the screw conveyor unit with larger capacities.

By using a fine-sand launder, or by arranging two conveyors in series, a coarse and fine sand can be produced.



**LINK-BELT**  
HANDLING  
PREPARATION  
EQUIPMENT

See Our Exhibit at the Conventions of the Nat'l Sand & Gravel Assn. Jan. 17-19th and Nat'l Crushed Stone Assn. Jan. 22-24th, at St. Louis.

JAN 19 1940

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**NEXT MONTH'S ISSUE**

February will be the annual convention number in which the proceedings of the National Sand and Gravel Association, National Ready Mixed Concrete Association, and National Crushed Stone Association conventions will be briefed so that the reader may obtain a complete picture of the outstanding features of these important meetings.

**Round Table Discussions**

Individual interest will be very active in the meetings of the National Sand and Gravel Association and the National Ready Mixed Concrete Association as a result of the round table discussions which are on the program for these two associations.

Of general interest to both sand and gravel and ready-mixed concrete groups will be discussions on the following topics: Private Construction Outlook, the Affect of War on Business, Outlook for Highway Appropriations, the Super-Highway Program, Safety and Health Activities, Proposed Extent of Industrial Mobilization.

**Sand and Gravel**

Of specific interest to the sand and gravel industry will be discussions at the convention of trends in specifications, including such practical subjects as: Elimination of Soft Stone, Functions of Specifications, Screen Efficiency, Soft Particle Elimination and Production of Crushed Gravel.

**Ready Mixed Concrete**

The round table discussions will also take the spotlight of interest in the ready-mixed concrete group meetings. Topics of practical value up for discussion include: Proper Design of Concrete Mixers, Purchase Specifications in Various Localities, Length of Haul, Usage of Wash Water, Economical Length of Haul, Cold Weather Concrete, Merchandising, Promotion, and Advertising.

**Crushed Stone**

Some outstanding speakers will be on the program of the National Crushed Stone Association annual meeting, and there will also be some very practical subjects discussed by leaders in the industry. Stirling Tomkins, president of the New York Trap Rock Corp., will describe his successful truck-trailer system and illustrate his talk with movies. The subject of pneumatic tires in quarry service also will be given by an expert. Speakers include Elmer Wheeler of Dale Carnegie Institute; Major Roy F. Britton will discuss the highway program; a railroad official will outline the ballasting requirements of the railroads; Dr. John W. Finch will present the safety trophy; Dr. E. De Turk of the University of Illinois will give an illustrated talk on the market for agricultural limestone; Major A. B. McMillan of the Civil Aeronautics Authority will have as his subject, "Expanding Our Airport Facilities"; Edwin B. George of Dun's Review will discuss price control; and John Gall of the National Association of Manufacturers will discuss governmental policies as they relate to business and labor relations. Otho Graves will present the report on seasonal exemptions.

# ROCK PRODUCTS

**RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD**

With which has been consolidated the journals *Cement and Engineering News* (founded 1896) and *Concrete Products* (established 1918)

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ROCK PRODUCTS Bears the Twin Hall-Marks of Known Value.



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*We  
Invite you—*

**S**TOP in and look us over. See these big Northwests with their powerful Welded Booms (and no Northwest Welded Boom has ever failed). Let us tell you about the Dual Crowd, the Cushion Clutch, the "feather-touch" Clutch Control and the other Northwest features.

Make our booth a place to rest! Meet your friends there! West end of Main Arena — we'll look for you.

**SEE A REAL  
ROCK SHOVEL**  
*at the Road Show*  
*Jan. 29-Feb. 2 International Amphitheatre*



NORTHWEST ENGINEERING CO., 1820 Steger Bldg., 28 E. Jackson Blvd., Chicago, Ill.

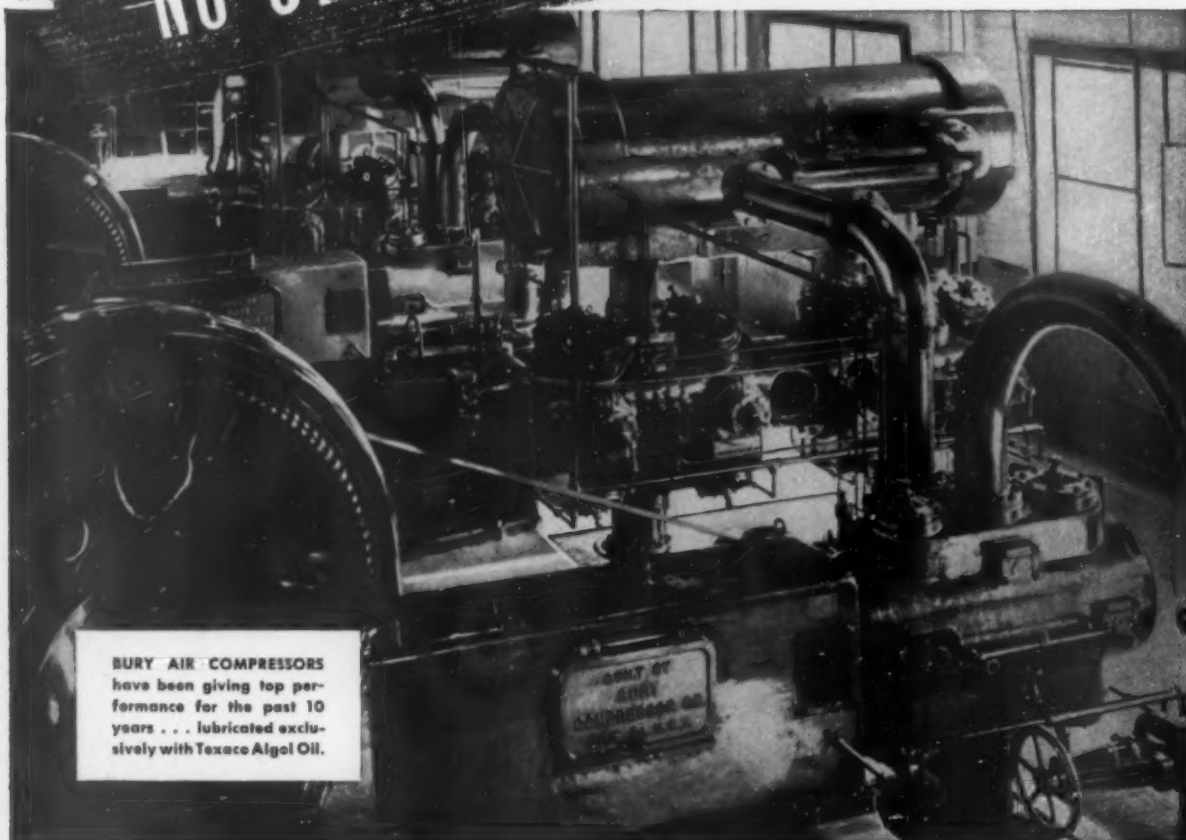
**NORTHWEST**

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS • SKIMMERS

*If it's a real  
Rock Shovel—  
you won't have  
to worry about  
output in dirt!*

**IN 10 YEARS...**

**NO STUCK VALVES OR RINGS**



**BURY AIR COMPRESSORS**  
have been giving top performance for the past 10 years . . . lubricated exclusively with Texaco Alcol Oil.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment—Every Wednesday Night—Columbia Network—9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.



**FOR 10 YEARS** these compressors have been lubricated exclusively with Texaco Alcol Oil. The operators report not a single failure, stuck valve or ring, not even a hot bearing . . . in 10 years.

You, too, can improve your compressor lubrication. Our engineers

are always ready to demonstrate savings with Texaco Alcaid, Alcol or Ursa Oils. To get this service or for prompt delivery, phone the nearest of 2279 warehouses in the U. S., or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

**TEXACO** Alcaid, Alcol and Ursa Oils

IN THE KENTUCKY STONE



COMPANY PLANT . . . . .

# TELSMITH GYRASPHERE

produces 120 tons per  
hour of minus 1½" stone!

●Wide experience . . . gained in operating ten quarries in Kentucky . . . has made the Kentucky Stone Company of Louisville very critical of quarry plant equipment.

For their Tyrone Plant\* they selected this No. 48 Telsmith Gyrasphere because they wanted to get finer crushing, a wider range of sizes as well as greater tonnage. Are they getting it? *They are.*

120 tons an hour of 1½" and down!

And the Gyrasphere would do better still, if the primary breaker, and the two vertical skips that hoist the rock from where it is mined underground, could dish it up any faster. With its unregulated choke feed this Gyrasphere sure can take it—and handle it—with less trouble, less power and less up-keep.

And why not—it's a rugged, high-speed, super secondary crusher—with every modern feature of design. Spherical head! Double wedge crushing action! Roller thrust bearings! Spring relief! Effective sealing and lubrication! Furnished with interchangeable coarse or fine crushing concaves, you can get the sizes you want—1½" to ¾", or ¾" to ⅜". And you'll get better, more cubical aggregate, too. *Bulletin Y-11* tells you why and how. *Get one.*

\* Plants at Irvington and at Russellville have also been modernized with Telsmith crushing and screening equipment.

Y-2-40



# TELSMITH

SMITH ENGINEERING WORKS  
308 E. CAPITOL DRIVE, MILWAUKEE, WISCONSIN

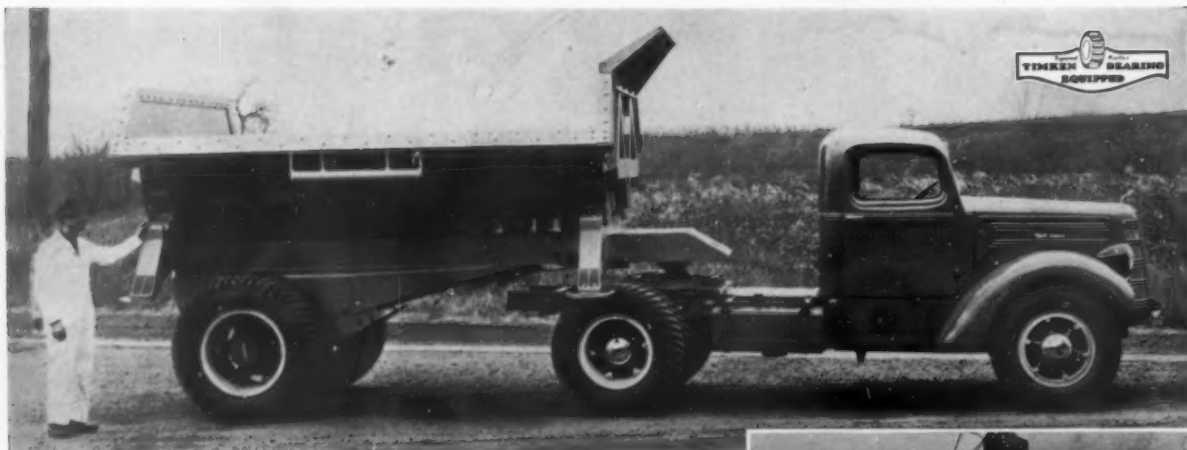
50 Church St.  
New York City  
51 Buxey St.  
Cambridge, Mass.

211 W. Wacker Drive  
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412 Washington Bldg.  
Pittsburgh, Pa.

713 Commercial Trust Bldg.  
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Gordon Russell, Ltd., Vancouver



*This Big New*  
**EASTON SEMI-TRAILER**  
*rolls on*



# TIMKEN BEARINGS

Built for bigger payloads in quarry haulage this new Easton Model TR-10 Semi-Trailer is equipped with TIMKEN Tapered Roller Bearings for smoother operation, reduced draft, increased dependability, longer life and lower maintenance cost.

By selecting TIMKEN Roller Bearings for this modern piece of hauling equipment, the Easton Car & Construction Company has made provision for the same phenomenal performance demonstrated by modern Timken Bearing Equipped locomotives, cars, streamlined trains and all kinds of industrial machinery—from precision machine tools to huge steel rolling mills. That means many additional miles of economical service—"Miles of Smiles" for everyone concerned with quarry operation.



THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

**TIMKEN**  
 TAPERED ROLLER BEARINGS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, rail-road cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

# its for you Mr. Operator—

## a new **MULTI-STAGE FINE REDUCTION CRUSHER**

- ★ MULTI-STAGE BELL HEAD AND CURVED CONCAVES
- ★ QUICK AND EASY ADJUSTMENT
- ★ SHOCK ABSORBER SUSPENSION
- ★ ABSOLUTE DUST PROTECTION
- ★ AUTOMATIC LUBRICATION
- ★ ROLLER-BEARING COUNTER-SHAFT

TRAYLOR-STEARN'S PATENTS

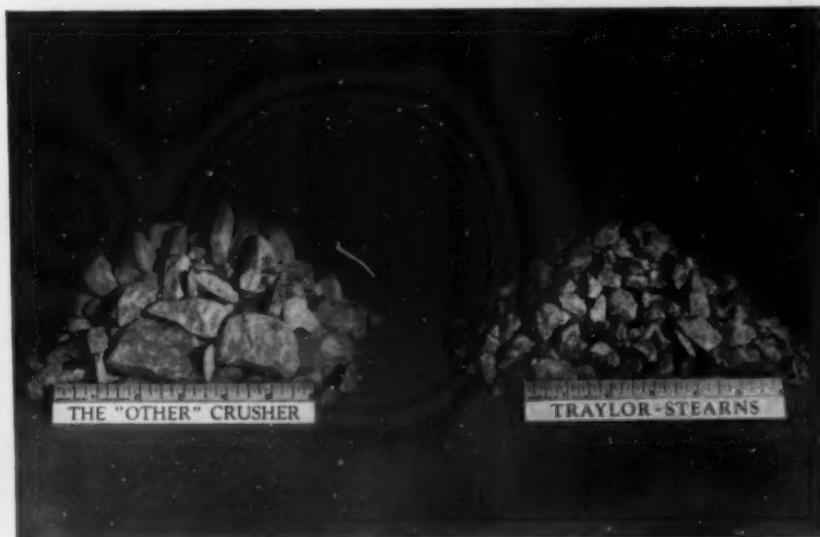
CRUSHES FINER AT GREATER CAPACITY WITH LESS POWER  
PRODUCT IS CUBICAL-NO SLABS, MINIMUM OVERSIZE  
POSITIVELY NON-CHOKABLE

WRITE FOR BULLETIN 113

SEE IT AT THE ST. LOUIS EXPOSITIONS, JAN. 17-19 & 22-24, 1940

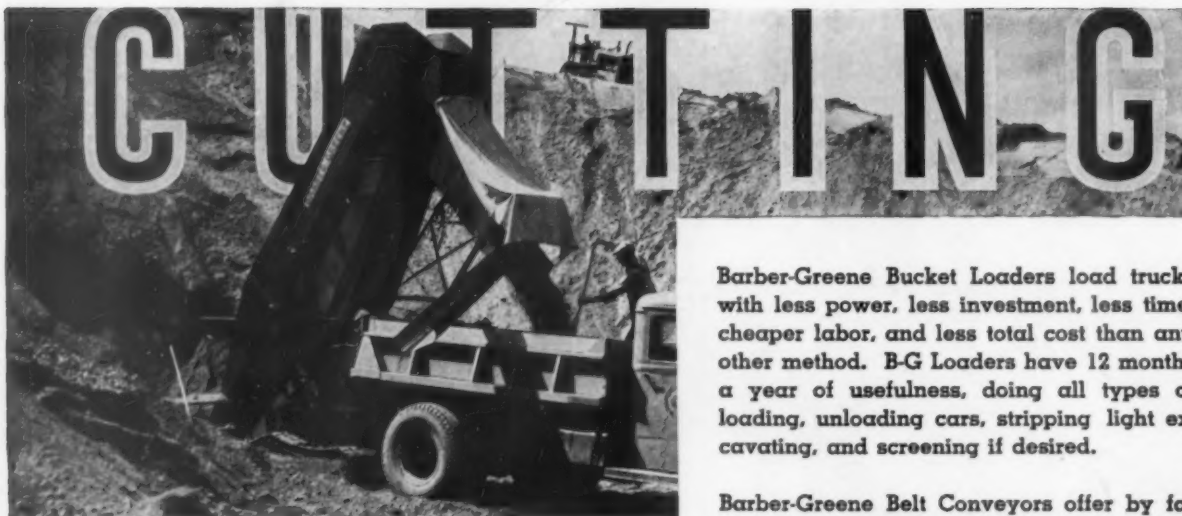
### PROOF POSITIVE I

The photo shows two samples of crushed trap rock, taken WITHOUT SELECTION from outflowing streams of finished output. To the left is the product of a 4'0" reduction crusher, (not a Traylor), extensively used, and at right that of a 3'0" TRAYLOR-STEARN'S MULTI-STAGE FINE REDUCTION CRUSHER. Both crushers had a feed of THRU 1 7/8" ON 7/8", a very slabby product of a secondary crusher. Both crushers were set to 5/16" closed side of discharge. The TRAYLOR-STEARN'S had an output of 60 tons per hour and the "other" crusher 45 tons per hour. The TRAYLOR-STEARN'S product contained 42.2% THRU 3/8", square holes, while the "other" crusher product contained 24.3% THRU 3/8", square holes. The TRAYLOR-STEARN'S used one H.P. per ton of product and the "other" crusher one and one-third H.P. per ton of product.



**TRAYLOR ENGINEERING & MANUFACTURING CO.**  
ALLENTOWN, PENNA. U.S.A.

JANUARY, 1940



*The Primary Purpose  
of  
All Barber-Greene*

Barber-Greene Bucket Loaders load trucks with less power, less investment, less time, cheaper labor, and less total cost than any other method. B-G Loaders have 12 months a year of usefulness, doing all types of loading, unloading cars, stripping light excavating, and screening if desired.

Barber-Greene Belt Conveyors offer by far the cheapest, most flexible, simplest method of unloading, stocking, moving bulk materials. Their standardized sectional construction gives unequaled original delivery, erection and change of set-up.

It is these facts that make Barber-Greene pre-eminent in Cost Cutting Material Handling. For full information, phone, wire or write Barber-Greene Company, 459 West Park Avenue, Aurora, Illinois.

38-8



STANDARDIZED MATERIAL HANDLING MACHINES

Representatives  
in Principal Cities

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BRANCH OFFICES  
Cleveland • Chicago • New York  
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*Standardized Belt Conveyors*  
CARRIERS  
Portable CONVEYORS  
Permanent CONVEYORS  
and other standardized unit parts  
LOADERS for lowest cost loading  
MIXERS for Bituminous or Stabilized Mixing Central or Travel Plant  
SNOW LOADERS for high speed removal  
Leveling-Tamping FINISHERS

*Low Cost-High Quality Road Construction*

HECK...NO PARTS ORDERS



*If we had to  
make a living  
selling Blaw-Knox  
Trukmixer Parts...*

...WE COULDN'T DO IT



WHY?

Simply because there is very little demand for them. Blaw-Knox Trukmixers, in all their parts, are made to stand the gaff and resist wear—not to wear out.

The carefully prepared Parts Lists which we furnish to our hundreds of customers are seldom used.

**SOMETHING TO THINK ABOUT... ISN'T IT?**

Hundreds of users will testify to the *long life*, freedom from breakdowns, and low maintenance

of Blaw-Knox Trukmixers, and to their ability to *stay on the job*.

*For long  
faithful service*

use . . .

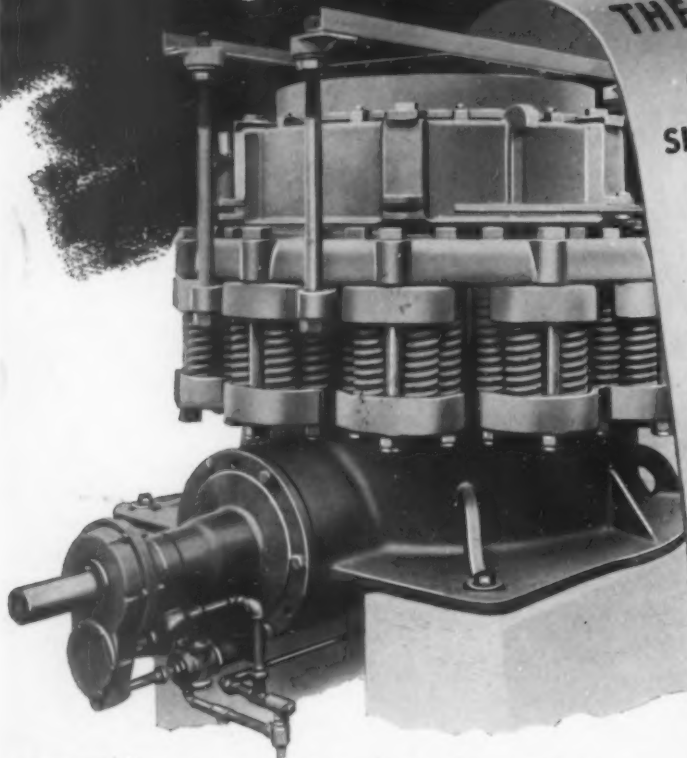
**BLAW-KNOX TRUKMIXERS  
AND AGITATORS**

BLAW-KNOX DIVISION

OF BLAW-KNOX COMPANY

FARMERS BANK BUILDING, PITTSBURGH, PA.  
OFFICES AND REPRESENTATIVES IN PRINCIPAL CITIES

# MEETING THE DEMAND FOR INCREASED OUTPUT OF FINER SIZED MATERIALS



## THESE PRODUCERS DID IT WITH **SYMONS** SHORT HEAD CONES

**BASIC DOLOMITE, INC.,**  
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**CLEVELAND SLAG CO.,**  
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**HAWKEYE PORTLAND CEMENT CO.,**  
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**JOHN S. LANE & SONS,**  
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**MARYLAND SLAG CO.,**  
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**NAREHOOD BROTHERS,**  
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**NEWTON COUNTY STONE CO.,**  
Kentland, Ind.

**NEW YORK TRAP ROCK CO.,**  
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**STURGEON BAY CO.,**  
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**T**HE Symons Standard Cone Crushers, which these producers originally installed, provided sufficient fine materials to meet the then existing needs. Later, however, when the demand for finer sizes greatly increased, Symons Short Heads were added to follow the Standard Cones. It is this combination which solves today's problem of providing a greater capacity of finer products at lower crushing cost as is being proved in plants of these and other progressive producers. If your plant is not equipped to meet the growing demand for fine size materials, investigate the merits of the Short Head Cone and the possibility of adding this Crusher to follow your present secondary crushing equipment.

**NORDBERG MFG. CO. MILWAUKEE WISCONSIN**

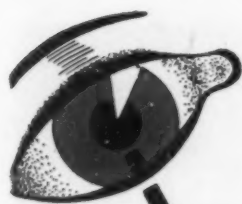
NEW YORK CITY  
60 E. 42 St.

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Subway Terminal Bldg.

TORONTO  
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LONDON  
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# SYMONS CONE CRUSHERS



**SEE**  
COST SHEET

**FOR YOURSELF**

HERCOMITE.....  
OLDER TYPE EXPLOSIVES...

**15% SAVING**  
WITH HERCOMITE

426 13

**WHY HERCULES HERCOMITE\* IS THE  
STANDARD EXPLOSIVE FOR QUARRYING**

Try Hercomite . . . See the wide range of bulk strengths  
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be used in any method of blasting . . . See how it  
gives desired breakage . . . See how easy it is on  
the shovel . . . See how it improves your cost sheets  
Then you will see for yourself why Hercomite  
has become the standard explosive for quarrying.

\*Reg. U.S. Pat. Off. by Hercules Powder Company.

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- ECONOMY
- SAFETY



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946 KING STREET WILMINGTON, DELAWARE

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# The latest, most modern materials available for more effective blasting

## ..completely listed in the New ATLAS Catalog

### *Ready now!*

With the new Atlas Catalog, you have at your fingertips complete information about the entire Atlas line of explosives. Products available for each specialized field are grouped for ready reference, with descriptions of the properties of each explosive.

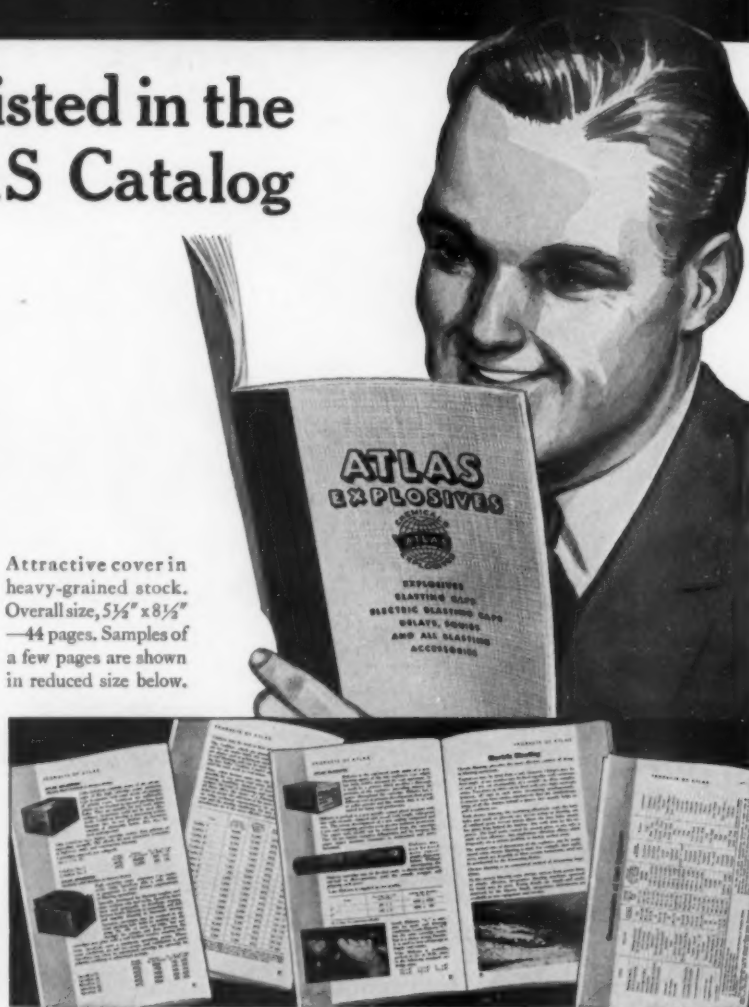
And—in this same book with specifications of Atlas explosives, you will find up-to-date, accurate information on blasting caps, electric blasting caps, delay electric blasting caps, electric igniters, blasting machines, rheostats, galvanometers, fuse,—all necessary blasting accessories.

Attractive cover in heavy-grained stock. Overall size,  $5\frac{1}{2}'' \times 8\frac{1}{2}''$  —44 pages. Samples of a few pages are shown in reduced size below.

### Not a manual

In order to present complete specifications and descriptions in the handiest possible form, instructions are omitted. The new Atlas Catalog suggests *what* to use for best results (not *how* to use it.)

Purchasing Agents, Superintendents, Blasters, and other persons responsible for safety, economy, and efficiency in blasting operations should have a copy of this new book. Send for your copy, or ask the Atlas representative for one.



## ATLAS POWDER COMPANY, WILMINGTON, DEL.

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# ATLAS

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The highest development in Roebling Wire Rope, "Blue Center" provides maximum resistance against wear and fatigue — assures maximum rope life and safety. **And safety means economy in the long run.**

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.  
BRANCHES IN PRINCIPAL CITIES

**STRONGER**—Wire of highest strength consistent with ductility and toughness

**TOUGHER**—Provides maximum resistance against wear, sudden shocks, vibration

**SAFER**—Unequalled for uniformity of quality

**SAVING**—Insures lowest general average operating cost

*Ask about ROEBLING "BLUE CENTER" WIRE ROPE . . . either standard or preformed*

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SHOVELS •

SEE US at the Road Show,  
Booth G-5



MODERNIZE  
with MARIONS

MAKE **1940** YOUR YEAR TO  
MODERNIZE WITH . .

# MARION

DRAGLINES • CLAMSHELLS • CRANES • PULL-SHOVELS • WALKERS

The benefits to be derived from Modernizing with Marions are found in such important features as: self-cleaning, non-clogging long and wide crawlers; full control of hoist and crowd clutches; easy operating, smooth setting, positive contact rotating clutches; high lifting capacity; vacuum dipper trip; vacuum swing clutches; independent chain crowd; ample speed and power. There is a Marion of the right size and capacity from 3/4 cu. yd. up for every material handling job, each machine being fully convertible. Write for catalog.

THE MARION STEAM SHOVEL CO. ★ MARION, OHIO, U. S. A.

# HERE'S THAT LOW-COST POWER AGAIN— “workin’ on the railroad”



**I**t's the same "Caterpillar" Diesel Power which has been setting the industrial world agog with its efficiency and economy. . . . The same engines which are making records of thousands of hours of steady, dependable, low-repair operating of tractors, crushers, excavators, graders, compressors, and mill machinery of all kinds. Powering yard, shifting, pit-and-quarry locomotives is just as natural and practical with "Caterpillar" Diesel Engines — just as profitable for their owners. Take the case of the Wabash Cement Co., Osborn, Ohio:

Here two "Caterpillar" Diesel-powered locomotives haul 40-ton train-loads of rock from quarry to mill. Over a  $\frac{3}{4}$ -mile haul, each locomotive handles twelve train-loads per day. Each engine uses only about two gallons of 8c fuel per hour.

In addition, maintenance costs are so relatively low and depreciation is so comparatively slow that no other type of hauling or equipment-driving power today can compare in economy with "Caterpillar" Diesel.

Because "Caterpillar" engineering and manufacturing are far past the experimental stage, these engines have design that involves neither frequent nor delicate adjustments; simplicity that requires no specially trained attendants; sturdiness and durability that enable them to take heavy punishment and assure long serviceable life. What's more, "Caterpillar" Diesel Engines are backed by the most complete and readily available replacement parts and service facilities of any engines in the world.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS



Leading manufacturers of excavating, contracting and industrial equipment power their products with "Caterpillar" Diesel Engines. Why not specify "Caterpillar" Diesel Power in your next purchase? Why not, also, replace present ageing power with "Caterpillar" Diesel — now?

ENGINE SIZES — 32 to 160 horsepower (max. rating)

ELECTRIC SET SIZES — 13 to 90 kilowatts (cost. rating)

## CATERPILLAR

DIESEL ENGINES AND ELECTRIC SETS  
TRACK-TYPE TRACTORS • ROAD MACHINERY

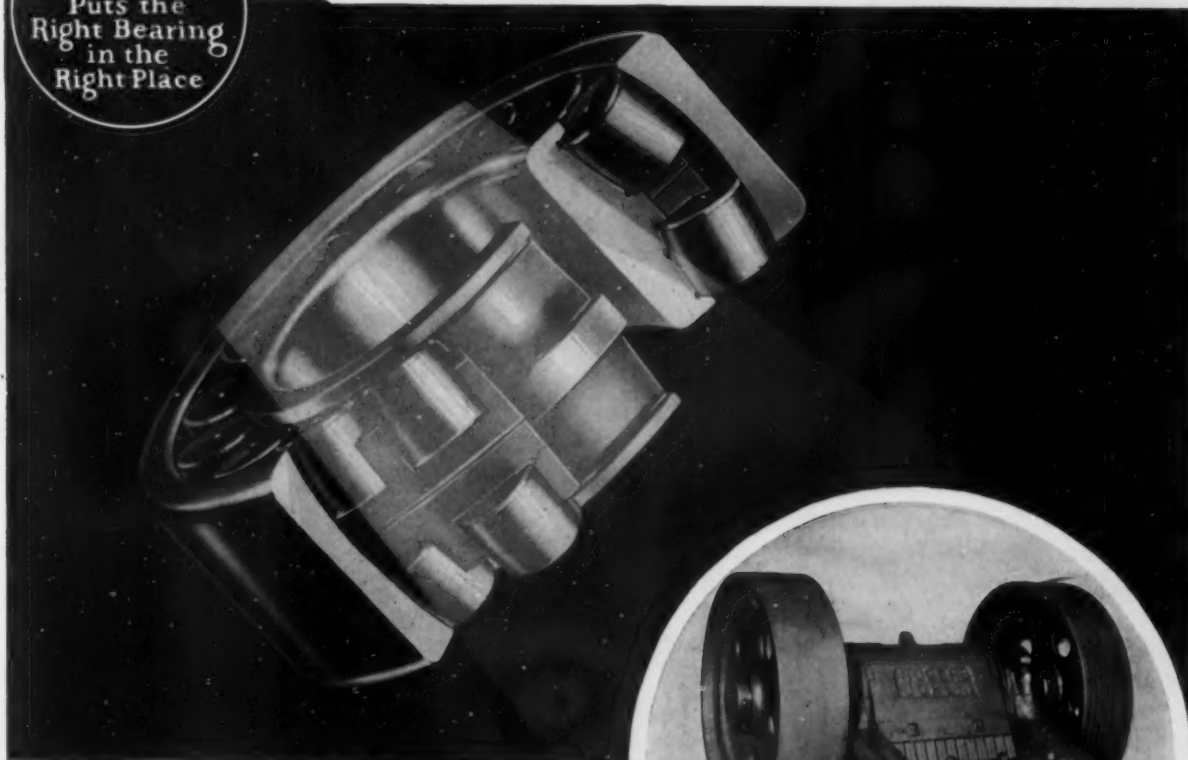
# ROGERS-JOPLIN



## CRUSHERS SIMPLIFY HARD JOBS WITH SKF BEARINGS

**SKF**

Puts the  
Right Bearing  
in the  
Right Place



**B**EARINGS are only a part of a crusher's cost, but they make or break its performance. So the Rogers Iron Works selected SKF Spherical Roller Bearings for main and pitman locations of this Rogers-Joplin Crusher.

Dust, dirt, and moisture blanket this machine. Terrible shocks and loads test its strength. But SKF's take it because their *high capacity* enables them to carry loads; their *self-alignment* prevents binding from shaft deflections resulting from high stresses. They *prove* they're the heavy duty answer to the quarry man's prayer. Why, then, aren't SKF Bearings on *your* crushers? There's an SKF man no farther away than your telephone.

4474

SKF INDUSTRIES, INC., PHILADELPHIA, PA.



Built by Rogers Iron Works Co.

# SKF

BALL & ROLLER BEARINGS

# "Here's the Favorite for '40"

• Meet the new Lorain-69—a 1¼-yd. shovel that will dig anything, anywhere, at the drop of a hat. It has a front end, consisting of an all-welded 21 ft. steel boom and 18 ft. stick, that revels in rock and ups operating ranges to a new high for 1¼-yd. machines. It has a stronger, more simplified Center Drive turntable that delivers Diesel power directly for each and every operation in the digging cycle and features such modern improvements as vacuum operation of swing clutches. It's mounted on a heavy, husky, 2-speed Center "Chain" Drive crawler that's a born traveler.

Yes, the Lorain-69 is a great shovel and, being convertible to crane, clamshell, dragline, skimmer or backdigger, it can be used to equal advantage on every type of job. See this modern 1¼-yd. machine "in person" at the Chicago Road Show or write for catalog. It's bound to be the favorite for '40!

THE THEW SHOVEL COMPANY  
LORAIN, OHIO



# NEW 1¼<sup>YD</sup> LORAIN 69



## American Optimism Returning

**T**HE NEW PRESIDENT of the National Association of Manufacturers, Henry Webb Prentice, Jr., is a Phi Beta Kappa. That may be unimportant, but to us is significant. Probably readers know Phi Beta Kappa is an honorary fraternity of outstanding liberal arts scholars. It is usual to find college professors members—doubtless the New Deal brain trust boasts of many—but unless we are greatly mistaken it is unusual to find members among top-notch business executives.

Of course, all scholars (meaning “learned men”) are not members of Phi Beta Kappa. Many of our deepest and most sincere thinkers are graduates only of the school of hard knocks, to use a hackneyed, but useful term. Learning in the liberal arts is acquired in many ways, but Phi Beta Kappa membership is at least a guarantee of brain capacity; or any way it is generally accepted as such.

Most business executives, after the experiences of the last few years, we are quite sure, would agree that their education in the liberal arts has been neglected, because liberal arts and business arts have not been a customary mixture. American business men have been world examples of material success—largely probably because they have concentrated their capacities on practical or material things.

However, the founders of our American republic were scholars. They were learned in the liberal arts, or they could not have written a constitution and founded a nation which made such practical use of liberal arts knowledge. It is a mighty healthful sign that we are all again returning to an appreciation of the application of liberal arts to the American scheme of things.

So because Mr. Prentice, apparently a genuine scholar, said it, we put more than ordinary faith in the following extract from his presidential address: “American business men in their own businesses must recognize their historic mission as preservers of the precious values of human liberty. To that end they should be shining examples of civic virtue, using that phrase in its classic sense. They must eliminate unethical practices in their own enterprises so that business can always come into the court of public opinion with clean hands; they must be keenly conscious of the social significance of their day-by-day decisions; they must be good stewards of the responsibilities with which individual freedom has entrusted them; they must constantly endeavor to create better conditions of employment by the elimination of health

and accident hazards; they must steadily seek ways and means of regularizing employment and cushioning the effect of advancing technology on the lives and fortunes of their workers; they must raise the standards of living by passing along the benefits of improved technique and quantity production through lower prices and higher wages; they must seek to be industrial statesmen rather than mere business men.”

We wish you would re-read that quoted paragraph. The more times you read it the more you will get out of it, and the better business man of 1940 and thereafter you will be. Note that Mr. Prentice did not say you should do these things. He said you *must* do them. You must do them if you want to preserve “the precious values of human liberty.” No real thinker, be he a Phi Beta Kappa scholar or a graduate of the school of hard knocks, can doubt that. We have seen scholars in government make it immensely popular because they have expressed the same sentiments much less concretely and less eloquently; and because they have sought to put them into effect. We have seen those same scholars become entangled in hopeless confusion because they lacked enough practical experience to understand business men.

We believe the scholar professors and bright young brains of the New Deal have rendered a genuine public service in agitating some of these things for industry. We know that they did not initiate the idea of social responsibility for industry. We wonder, though, if a man of Mr. Prentice's background would have been so acceptable a leader of American industry a decade ago.

The sentiments that Mr. Prentice expressed were not echoed in all other addresses at this Congress of American Industry. There was evidence that some leaders of industry still contend government should “keep hands off business;” plenty of evidence of joyful anticipation in the prospective crumbling of the New Deal edifice. There are some apparently who do not yet realize, or at least do not concede, that the New Deal sweep was not simply the victory of a political party but actually a revival of Americanism—sound in so far as it was conceived by many citizens; but it was considerably distorted and confused in execution by the government they chose to do it.

*Nathan C. Rockwood*

# Elements of Cost in a Barrel of Portland Cement

By NATHAN C. ROCKWOOD

**W**ITH THE assistance of the presidents and auditors of several large portland cement companies we present herewith an unusual breakdown of the unit cost of a barrel of cement from 1925 to 1939, inclusive. None of the companies had broken down costs in this manner, and we appreciate that fulfillment of our request for the necessary figures involved a great deal of work. For that and the co-operation and the friendship evidenced we are more than grateful.

The cost figures analyzed represent probably between one-third and one-half of the total production of the country for the period, and are therefore truly representative. To portray graphically the history of the industry during the period we have superimposed a curve showing the yearly shipments, of the industry as a whole. This seems more pertinent than any other single factor, although a comparison with unit mill price through the period might also be interesting.

We will not attempt to discuss all the conclusions or suppositions that might be drawn from the charts. We hope some of the auditors and accountants will see something in them as interesting as the things we see. We will be glad to have their suggestions and comments for later use.

In the charts the unit cost of manufacture of portland cement is broken down in percentages into (1) Labor; (2) Manufacturing costs other than labor—raw materials, fuel, power, operating and repair materials and supplies; (3) Selling cost; (4) Overhead—including investment and administrative, depreciation and depletion; (5) Tax cost (national, state and local). Fig. 1 shows (1); Fig. 2, (2), etc. The black line is the

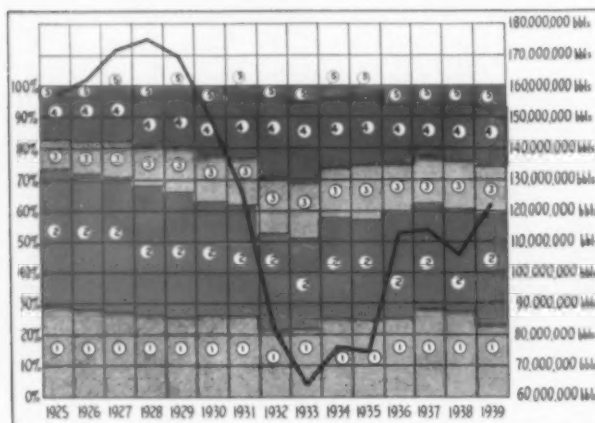


Fig. 6—Summary of charts 1 to 5 inclusive, showing effects of changing conditions 1925-1939 on various factors in the cost of a barrel of portland cement

average; the blue line is the lowest limit and the orange line the upper limit. A summary of the average figures are shown in Fig. 6. The figures for 1939 are not complete, of course, but are estimates based on 10 or 9 months.

During the period covered were many changes in labor conditions, hours were shortened, wages were increased, etc. The changes that took place in sales and marketing need no emphasis. Under such conditions it seemed to us the only true comparison was in the percentages of various items of cost. Theoretically perfect efficiency would probably mean approximately the same percentages under any and all conditions, each of these items having been reduced to a minimum.

It seems to us that the most striking thing about the summary chart (Fig. 6) is the comparative uniformity throughout of the percentage of labor cost. It suffered much less fluctuation than other items. The chart might be interpreted in many ways, but it seems safe to conclude that labor got its full share of every cement dollar, even though fewer were employed and the hours worked were less.

Another striking thing is the doubling of the tax cost in the last few years, until it now represents 7 percent of the total cost. Were the tax cost included here as part of the fuel, power and material costs, separated, undoubtedly the total tax cost would be increased another 3 percent, making a total of 10 percent as the tribute to government in every bag of cement sold.

The graph Fig. 6 shows clearly that sales and overhead costs are not so easily readjusted as direct manufacturing costs. We presume this is because they bear the full brunt of changes in volume, which have such a profound effect on unit costs. That these costs were cut deeply there is ample evidence, when we consider that in 1933 they were spread over little more than one-third of the total volume of that in 1928.

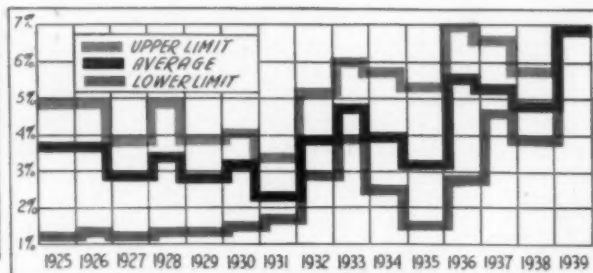


Fig. 5—Tax cost (national, state and local) charged directly against a barrel of cement

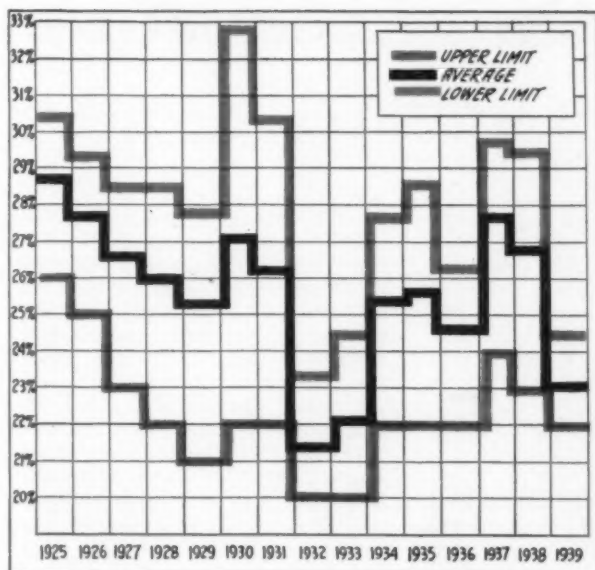


Fig. 1—Labor cost of a barrel of cement

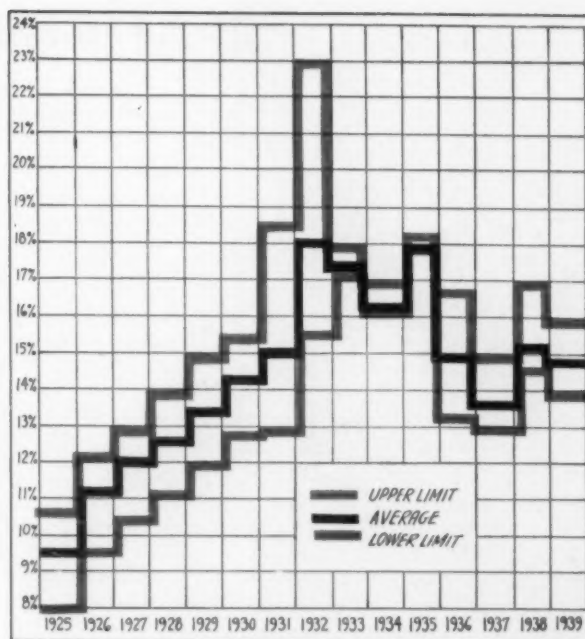


Fig. 3—Selling cost

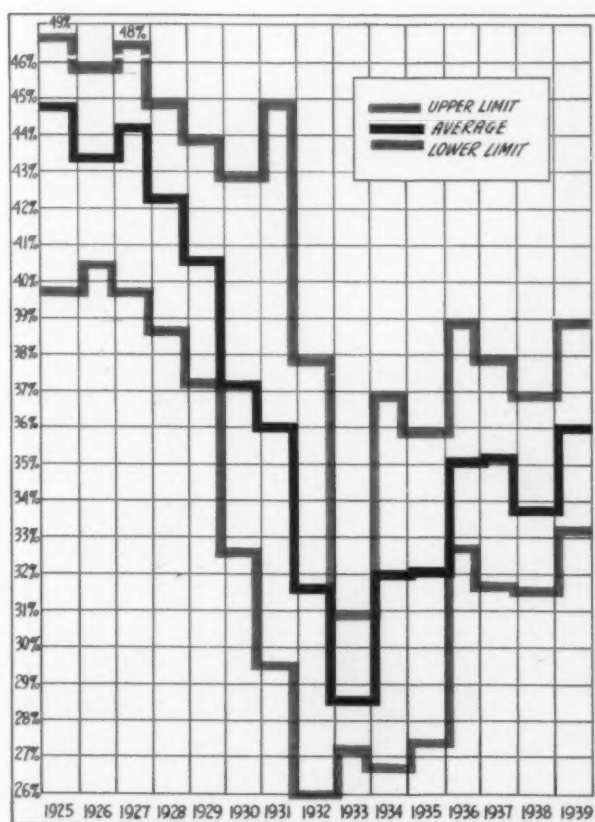


Fig. 2—Manufacturing costs other than labor—fuel, power, materials and supplies, etc.

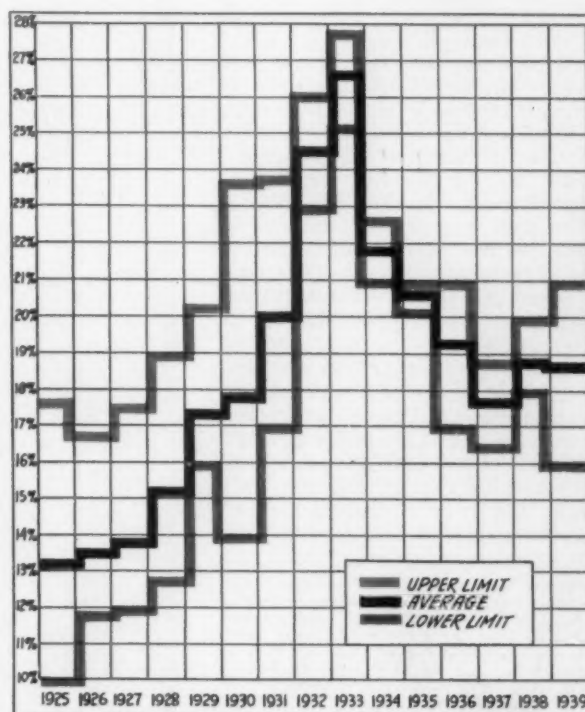
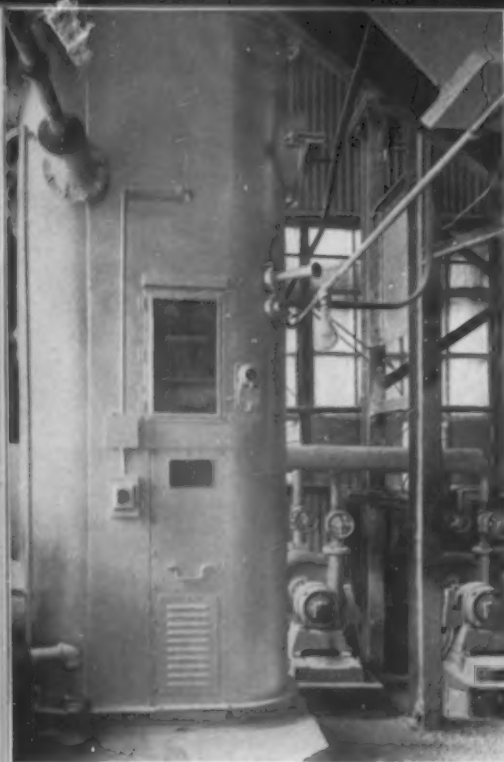


Fig. 4—Administrative and investment costs, including depreciation and depletion

# Distilling Limestone



Above: Cottrell electrical precipitator which removes the vapor of common salt from the  $\text{CO}_2$  distilled from limestone

**L**IMESTONE CALCINATION is probably destined to be merely the first step in a huge chemical industry yet to be born. At last there appears to be a successful retort type kiln, in which pure  $\text{CO}_2$  gas is distilled. It was perfected and is operated by the Frozen Carbonic Corporation, on Neville Island, Pittsburgh, Penn. The  $\text{CO}_2$  is compressed into dry ice and marketed directly over the states of Pennsylvania and Ohio by the Frozen Carbonic Corporation.

The Cottrell electrical precipitator made by the Research Corporation is not in this instance a "dust" collector. It precipitates common salt (sodium chloride) which is present in appreciable quantity in the "pure"  $\text{CO}_2$  distilled from the limestone. The salt caused rapid corrosion of the compressors. All limestones, however, may not contain salt. They may contain other recoverable materials (or vapors on calcination) of greater value. And the only use of  $\text{CO}_2$  is not dry ice. A lot of organic chemical products could start with  $\text{CO}_2$  as a base, just as in the inorganic chemical field lime is the starting point

Right: H. Hillman, III, manager, and chemist with vision, who had much to do with perfecting the kiln and process, shown here with a special alloy pre-heater, used on top of the kiln to heat the limestone to 1000 deg. F. before entering the calcining chamber. This was installed in August, 1939 and increased heating efficiency 20 percent. The kiln makes 4 tons of  $\text{CO}_2$  and 6 tons of lime per day

for manufacture of many products.

The all important problem solved was finding or developing a satisfactory refractory. This was found in Carbofrax, "super-refractory" tile, made by the Carborundum Co. This is claimed to have a high rate of heat transfer—twelve times that of fire clay. These tile are  $1\frac{1}{2} \times 6 \times 12$  in., tongued and grooved. There are a number of special shapes for the corners, louvres, etc.

The Carbofrax flue, or kiln proper, is enclosed in a  $13\frac{1}{2}$ -in. firebrick wall, insulated on the outside with Johns-Manville Superex. The lime is discharged continuously through an air-seal quadrant gate with water-cooled bearings. The speed of this gate is adjustable, and that speed of course determines the length of time

the limestone is retained in the kiln.

Before going to the Cottrell electrical precipitator, already referred to, the hot  $\text{CO}_2$  gas distilled from the limestone, uncontaminated with fuel gases, is put through a 12-in x 5-ft. scrubber to remove lime and limestone dust and to cool it.

The kiln illustrated is the result of a gradual evolution from the Gillette kiln first described and illustrated in *Rock Products*, August 25, 1933, p. 41-42. This original kiln was built by the Gillette Research Corporation, Toledo, Ohio, after ideas and designs supplied by Dr. Edward P. Gillette, who, incidentally is a son-in-law of J. J. Urschel, of the Woodville Lime Products Co. Dr. Gillette is a practicing physician of Toledo. The original kiln was 3x20



**ROCK PRODUCTS**

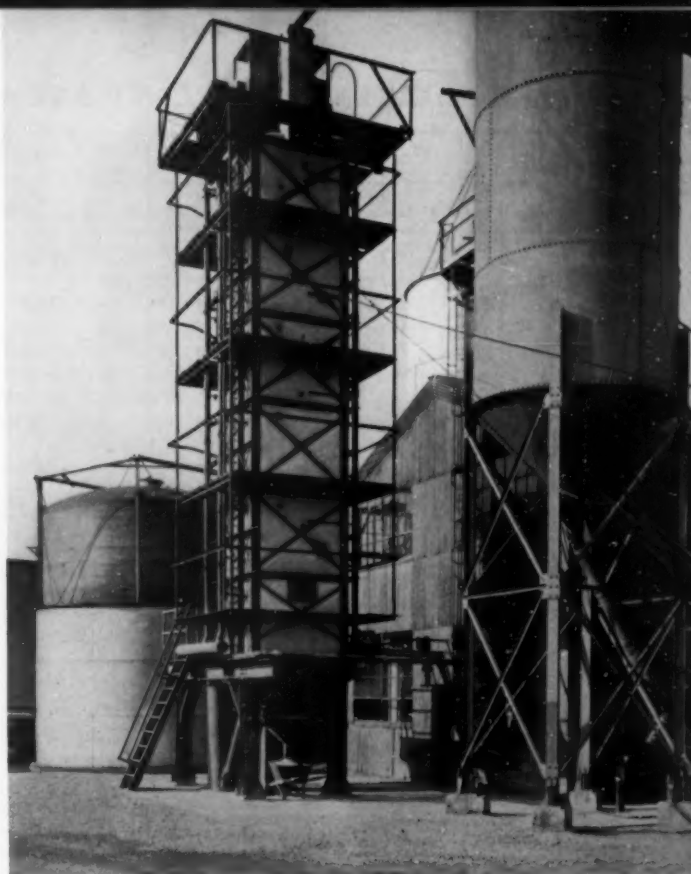
# -A New Industry

in. inside dimensions by 24 ft. high.

There were many practical operating difficulties, and not until the Frozen Carbonic Corporation had built and experimented with its kiln were these difficulties satisfactorily solved. Dr. Gillette began his experiments about 1928, so the kiln was actually about 10 years in developing into a commercial device. This certainly is evidence that its promoters were not easily discouraged.

Aside from the difficulties of operation, practical difficulties were met with in disposing of the dry ice. This business has been kept pretty well centralized and little or no encouragement has been offered to new producers. The present distributors naturally did not want new competition, and as purchasers of the material took advantage of their practical monopoly of distribution. The Frozen

Right: Perfected Gillette lime kiln, or carbon dioxide generator



Below: Showing kiln construction. The dark colored blocks at the back are the kiln proper. The Carbofrax liners enclose a chamber or flue 2½ in. wide by 36 in. long and 29½ ft. high. The outside combustion chambers are on the wide sides of this flue and the narrow ends have louvers every fourth tier of liner blocks to permit the CO<sub>2</sub> to escape into sealed ducts

Carbonic Corporation got around this difficulty by becoming a distributor itself.

Dry ice is of course a much more valuable product than lime, yet a high grade limestone is nearly half CO<sub>2</sub>. The lime manufacturer there-

fore discards by far the most valuable part of his raw material. The value of CO<sub>2</sub> is not likely to decrease greatly even when much larger quantities are available, for its use as a refrigerant has hardly begun. A simple little machine which the editor saw in San Francisco a year ago, would greatly extend the field of dry ice refrigeration.

This device consisted of an insulated pressure chamber to hold a cake of dry ice and a small pump, power for operation being supplied by the CO<sub>2</sub> itself, as the ice evaporated. Below the cake of dry ice was a pool of alcohol which was chilled to a temperature way below zero F. This chilled liquid was circulated through pipe coils by the pump. When the desired temperature was reached, a thermostat threw out the pump, and the CO<sub>2</sub> exhausted to the atmosphere or to the interior of the refrigerator, if desired. This provided what has been lacking to make CO<sub>2</sub> refrigeration of universal application. The only thing that worried the inventors and patentees was a plentiful supply of CO<sub>2</sub> ice. We presume that is what is still holding up the widespread use of this device.

The Gillette kiln as perfected is being promoted commercially as a carbon dioxide generator by the Gillette Kiln Sales Co., of which J. H. Hillman, III, is manager.



# VARIATIONS OF PLANT AVERAGES FOR DIFFERENT SIZE STONE

MIDDLEFIELD #1				ROCKY HILL #3				PLAINVILLE #4								CHESHIRE #6				NORTH BRANFORD #7									
				EAST								WEST																	
		HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.
2"	2½"					100	97.8	99.9	2.1	100	100	100	0.0	100	97.5	99.3	1.8	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0
	2"					96.2	75.3	85.7	10.5	78.5	66.4	70.5	8.0	88.9	69.9	79.9	10.0	86.5	93.0	7.0	98.9	84.9	91.6	7.3	89.5	95.8	81.2	8.3	
	1½"					32.5	12.5	26.0	13.5	29.3	15.0	18.5	10.8	44.4	23.9	32.5	11.9	53.6	17.0	33.5	20.1	38.6	25.0	35.5	10.5	15.6	7.5	11.0	4.6
	1"					5.6	1.5	2.9	2.7	5.1	1.3	2.3	2.8	6.0	2.6	4.0	2.0	4.5	2.1	3.5	1.4	13.7	3.2	7.9	5.6	1.5	0.4	1.0	0.6
1½"	2"																									100	100	100	0.0
	1½"																									89.3	63.1	75.6	13.7
	1"																									12.5	2.3	7.4	11.1
	¾"																									3.1	0.7	1.3	1.6
1¼"	2"					100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0				
	1½"					96.4	85.8	87.6	8.8	100	95.4	99.6	4.2	100	100	100	0.0	100	100	100	0.0	99.0	88.5	95.7	7.2				
	1"					37.9	15.8	27.7	11.9	66.3	35.4	51.2	15.8	79.1	60.3	65.6	13.5	79.1	60.3	65.6	13.5	46.4	24.0	39.6	15.8				
	¾"					12.8	4.8	9.2	4.4	36.3	10.9	21.7	14.6	45.0	16.9	26.5	18.5	45.0	16.9	26.5	18.5	19.7	5.7	18.5	12.8				
1"	1½"																									100	100	100	0.0
	1"																									61.6	32.3	51.8	19.5
	¾"																									4.6	1.6	3.3	1.7
	½"																									2.8	0.9	1.4	1.4

		MIDDLEFIELD #1				ROCKY HILL #3				PLAINVILLE #4								CHESHIRE #6				NORTH BRANFORD #7											
		HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	EAST				WEST				HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.	HIGH	LOW	PLANT AVER.	DIVER.
		LARGE				SMALL																											
3/4"	1"	100	99.9	100	0.1	100	99.3	99.9	0.6	100	100	100	0.0	100	100	100	0.0	100	99.2	99.2	0.8	100	100	100	0.0	100	98.6	99.8	1.2				
	3/4"	93.1	74	82.6	11.4	100	99.3	99.6	0.4	94.3	87.3	91.6	4.3	96.2	76.5	81.8	5.6	87.4	73.1	87.9	4.7	91.6	80.7	85.9	5.7	77.1	52.7	67.1	16.4				
	1/2"	10.5	8.8	9.8	1.0	44.7	7.4	28.5	16.2	31.6	19.4	27.1	7.7	30.2	23.0	25.7	4.5	31.3	17.9	26.6	8.7	23.0	9.2	15.0	8.0	19.1	2.9	6.2	12.9				
	1/4"	4.3	0.7	2.5	1.8	4.3	0.7	2.5	1.8	5.1	1.5	2.2	2.9	2.5	1.8	2.2	0.4	3.1	1.7	2.3	0.8	9.4	2.0	5.0	4.4	11.8	0.7	3.0	8.8				
1/2"	3/4"					100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0
	1/2"					100	75.4	81.2	8.8	99.2	98.2	98.7	0.5	87.8	96.0	96.9	0.9	100	93.1	98.1	5.0	95.7	84.0	90.0	6.0	97.5	84.7	92.1	7.4				
	1/4"					51.6	43.6	41.2	10.4	44.0	5.9	11.0	5.1	34.6	17.5	26.1	8.6	55.1	14.8	35.5	20.7	32.0	12.4	21.2	12.8	28.2	4.1	15.3	12.7				
1/4"	1/2"					100	100	100	0.0					100	100	100	0.0	100	100	100	0.0												
	3/8"					100	99.2	99.7	0.5					100	100	100	0.0	100	100	100	0.0												
	1/4"					69.6	49.2	62.3	13.1					100	100	99.9	0.1	100	100	99.9	0.1												
	1/8"					3.1	0.8	2.1	1.3					6.2	4.7	5.6	0.9	6.2	4.7	5.6	0.9												
SCREENINGS	1/2"					100	100	100	0.0	100	100	100	0.0	100	100	100	0.0	100	98.2	100	1.8	100	100	100	0.0	100	100	100	0.0	100	100	100	0.0
	3/8"					100	99.9	99.9	0.1	100	100	100	0.0	100	100	99.1	0.9	100	96.9	100	3.1	100	99.7	100	0.3	100	99.8	100	0.2				
	1/4"					98.3	96.3	97.8	1.1	97.7	89.2	94.6	5.4	99.9	98.7	98.2	1.7	100	88.0	99.1	11.1	97.9	72.8	93.4	15.6	99.3	92.8	96.1	3.3				
	1/16"																																

# Reducing Shipping Losses

## ARTICLE TEN

**On crushing, sizing, testing and specifying of aggregates compares normal plant averages with four state specifications**

**A**N ATTEMPT was made at first to interpolate by means of graphs, using the Connecticut screens, but this interpolation not having the accuracy desired, in several cases appeared questionable, and it seemed necessary to run another set of tests, using the screens required by

By **ELWOOD T. NETTLETON\***

Massachusetts, Rhode Island and New York states.

With the results of all the average graphs using testing screens as specified by the highway depart-

ments of these four states, a table was made up for use in shipping. It might be noted that since the compilation of these tests, changes have been made at some of the quarries. Stone which was listed as not passing at the time may now meet the requirements. This does not mean that all the various sizes at each quarry meet all four sets of specifications. Such a thing is quite impossible due to the divergence in limits and tolerances. This difference naturally places a hardship on the producer in balancing of orders between plants, in taking advantage of lowest freight rates, and in numerous other operating and storage problems.

### Stone Grading Graphs

Two series of graphs were included in this series of articles on grading of stone at the North Branford quarry in 1936. The first series is the plotting of individual tests along with the specification limitations of Connecticut for various commercial sizes. In these graphs only a small percentage of the representative tests are included. To include all the tests for each size stone on one graph, the lines would become so intermixed that it would be impossible to read. Consequently, from seven to twelve tests only were included, rather than several hundred.

The second series of graphs shows the comparison of the plant averages for various sizes of stone with the specification limits of Connecticut, Massachusetts, Rhode Island, and New York. This series shows graphically what the tables referred to have listed. Only a sample graph, appearing on the following page, is the data developed.

After one year of operation it was considered advisable to recheck the former year's normal plant averages.

\* Engineering Director and Secretary, New York State Crushed Stone Association, Albany, N. Y.

SIZE	CONN.	MASS.	R. I.	N. Y.
<b>PLANT No. 1 AT MIDDLEFIELD</b>				
2 in. Mix	(A) No	2 1/4 B (No. 1+2) Yes	(2 1/4) ?	No. 3A No
2 in.	(C) Yes	(2 1/4) —No. 1 Yes		No. 3 Yes
1 1/4 in.	(B) Yes			
3/4 in.	(E) No	No	No	No
1/2 in. Large	(E) Yes	?	Yes	Yes
1/2 in. Small	(F) No	No	No	No
1/4 in.				?
Screenings	Yes			
<b>PLANT No. 3 AT ROCKY HILL</b>				
2 in. Mix	(A) No	2 1/4 (No. 1+2) Yes	2 1/4 Yes	No. 3A No
2 in.	(C) Yes	2 1/4 (No. 1) ?		No. 3 ?
1 1/4 in.	(B) Yes			
3/4 in.	(E) Yes	No	No	No. 2 No
1/2 in.	(F) No	Yes	Yes	No. 2 ?
1/4 in.				
Screenings	(G) Yes	Dust Screenings Yes		Yes
<b>PLANT No. 4 AT PLAINVILLE</b>				
2 in. Mix		2 1/4 (No. 1) Yes	2 1/4 ?	No. 3 Yes
2 in. East	(B) Yes	2 1/4 (No. 1) Yes	2 1/4 ?	No. 3 Yes
2 in. West	(B) No			
1 1/4 in.				
3/4 in. East	(E) Yes	No	No	No. 2 No
3/4 in. West	(E) Yes	No	No	No. 2 No
1/2 in. East	(F) No	?	?	No. 1 No
1/2 in. West	(F) No	No	No	No. 1 No
1/4 in.				?
Screening East	(G) Yes	Dust Screenings Yes		Yes
Screening West	(G) Yes	Dust Screenings No		Yes
<b>PLANT No. 5 AT GRANBY</b>				
2 in. Mix	(A) No	Yes	Do not ship into these states from quarry.	
2 in.	(C) No	No		
1 1/4 in.	(B) Yes			
3/4 in.	(E) Yes	No		
1/2 in.	(F) No	Yes		
Screenings	(G) Yes	Dust Screenings Yes		
<b>PLANT No. 6 AT CHESHIRE</b>				
2 in. Mix	(A)	Do not ship into other states from this quarry.		
2 in.	(C)			
1 1/4 in.	(B)			
3/4 in.	Yes			
1/2 in.	No			
Screenings	Yes			
<b>PLANT No. 7 AT NORTH BRANFORD</b>				
2 in. Mix		2 1/4 Yes	2 1/4 Yes	No. 3 Yes
2 in.	(B) No			No. 3A ?
1 1/2 in.	(C) No			No. 2 No
1 in.		No	Yes	No. 3A No
3/4 in.	(E) No	Yes	Yes	No. 2 ?
1/2 in.	(F) No			
Screenings	(G) Yes	Dust Screenings Yes		Yes

Left: Guide compiled from normal plant averages to determine whether particular size meets state specification

- (1) For comparative purposes.
- (2) To establish new normal plant averages where screens had been altered.
- (3) To catch any changes in operating conditions which may not have been noticed; such as, increase in wear of screens, holes in screens, change of rate and pitch of screens, and other numerous factors.

It was also considered advisable to run additional grading tests on the stone screenings as produced by the various quarries. This was done by means of a standard set of Tyler nesting sand screens.

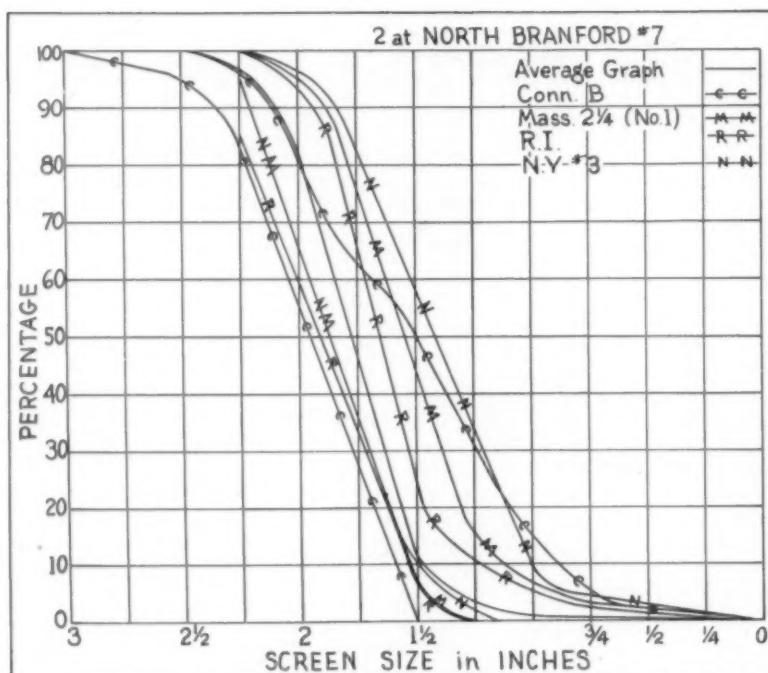
#### Variations of Plant Averages

By a comparison of the Stone Grading Tables, giving the plant averages for any one size with the individual stone grading graphs for the same plant and size, it may be seen to what extent over a period of a year of commercial production any individual test may vary from the plant average.

This information is very important in interpreting whether a certain size stone at a given plant meets any particular specification. The mean average of this stone may fall just within the specification, but, at the same time, individual test results may at certain points fall without. Consequently, it might happen that three-fourths of the shipments would be satisfactory and one-fourth condemned, due to normal variation under present day operating conditions. This condition could occur without any apparent change in operation or screen sizes. Consequently, it is desirable to ascertain definitely whether any certain size at a given plant could continue daily to meet any particular specification. With this in view tables were computed, as shown herewith. Those tests of wide divergences as the results of some unusual or avoidable condition were eliminated.

As a rough general approximation, it might be said that in general the maximum fair deviation off the normal plant averages would be 2 percent—15 percent—10 percent; where 2 percent would be the maximum limiting or passing screen, 15 percent the intermediate screen, and 10 percent the minimum or retaining screen.

For any size the total comparative deviation from minimum to maximum on any two test samples should not be in excess of twice the figures of any one sample off the average or normal graph figures.



Typical graph comparing plant averages for various sizes of stone produced at Branford plant No. 7 with state specification limits

These figures would apply under normal operating conditions. Oftentimes where flat bottom bins are used and stone in bins become low, or where chutes not regularly used are opened, the deviation will be considerably more.

Where any deviation in excess of these figures is found plant operation should be checked immediately.

(To be continued)

#### Rock Wool Opportunities in Georgia

THE Department of Natural Resources, Division of Mines, Mining and Geology, Atlanta, Ga., has issued Information Circular No. 10, by A. S. Furcron, A. C. Munyan and R. W. Smith, on "Rock Wool; Opportunities for Manufacturing in Georgia." The report estimates the probable market and gives analyses of various rock deposits from which rock wool might be made.

The report concludes with a helpful bit of advice to would-be producers:

"The construction of a plant for the production of rock wool is not a difficult problem, but the operation of the plant calls for technical, experienced, and capable men provided with adequate laboratory equipment for control purposes. The plant should be so designed that it can be operated as units, and constructed as units—additional parts being added

as increased demands for the product warrant.

"A generously financed program for such a business should be the first consideration of any prospective investor. Funds should be provided not only for an efficient plant, but also for a comprehensive sales campaign. That is not to say, however, that the rock wool producer must have financial backing in excessive proportion to other ventures of similar type, but only to point out that a quality product depends entirely on adequate plant facilities for turning it out, and a sales program for getting it to the consumer."

#### Trying Decomposed Sandstone for Highways

MONTANA's state highway department is planning to experiment with the use of decomposed sandstone in the construction of bituminous surfaced highways in place of gravel. State Highway Engineer, D. A. McKinnon and D. L. Cheney, bituminous engineer for the department, have decided upon a system of utilizing the sandstone to mix with the oil surfacing and a three-mile section of road now is being built. Mr. McKinnon said that there is no gravel available in that section, but there are millions of tons of decomposed sandstone. He said, "If the experiment is successful, it will cost us about \$2 a cubic yard to supply the sandstone, compared with about \$6 a cubic yard for gravel."

# Washing-Classifying Sand

## Part 9.—Typical conditions where classifiers and screens in combination will attain the desired results and a method of determining classifier efficiency

By EDMUND SHAW

ONE sometimes hears screens and classifiers spoken of as though they were rivals, but actually they are partners. It is true that their fields somewhat overlap, but even in this part investigation will usually show that one or the other will be the most economical to use.

For dry materials of any size but the very fine it is better to use screens, for air separation has not been considered very practical for materials coarser than 100-mesh. It is the writer's opinion, however, that it could be used for much coarser grains, and he has seen some experimental work which tends to confirm his opinion.

### Screens and Classifiers

Where the material is wet, because it is dredged, or because it has to be washed before being sized, the classifier is better. If, as in making blast sands, the products have to be more closely sized than is possible by classification, a good method is to make a rough separation by classification before screening. This reduces the amount that must be dried before screening. In one case the tonnage to be handled by the dryer and the screens was cut in half by adopting this method. The classifiers used were simple cones followed by hindered

settling classifiers of the writer's design.

But the maximum size is usually the deciding factor. When this is

Edmund Shaw, author of this interesting series of articles and widely known throughout the industry, died recently after an extended illness. The series of articles had been practically completed before his death, and will be continued in forthcoming issues. Mr. Shaw had devoted a good share of his life to studies which improved the methods and equipment and broadened the knowledge concerning efficient operation in the aggregates industries. A sketch of his life and contributions to the industry appears elsewhere in this issue.—The Editor

more than  $\frac{1}{4}$  in., classification is not much if ever used. I have heard of its being successfully used in a temporary plant for splitting sand and gravel as they came from the de-

posit, making a fine and a coarse aggregate, and this could be done with some materials. But it is the usual practice, founded on long experience, to classify only sand grains.

Classifiers make separations by the differences in weight of the grains, while screens take into account only their length and breadth. The astonishing thing is that with materials free from scaley pieces, and those of less specific gravity than the average, the products of screening and classification should be so much alike. Fig. 14 shows four curves, two of screen products and two of classifier products. The classifier products are of sand-size grains, the screen products of larger grains. But the similarity of the graphs is remarkable, both in shape and the angle made with the base line. These examples were not selected but were taken at random from a number of sieve analyses.

### Mixtures of Different Specific Gravities

In the metal mining industry, ore dressing is applied to many ores to separate the valuable mineral from the "gangue" or worthless rock, to reduce the costs of transportation and smelting. Many of the processes of ore dressing are forms of classification. Coal usually contains the heavy mineral pyrite and fragments of wall rock, which come down with the coal as it is mined. These are separated from the coal by classification and other ore-dressing methods.

Two machines much used in concentrating ores and cleaning coal are the jig and the shaking table. Both have come into use in the rock products industries in the last twenty years or so, for removing lignite, shale, clay balls, chips and perhaps some other foreign substances from concrete aggregates.

As the better deposits of sand and gravel become exhausted, it is to be expected that such methods will be used more and more.

Some of the devices now in use for this work are classifiers of the screw type fitted with arrangements

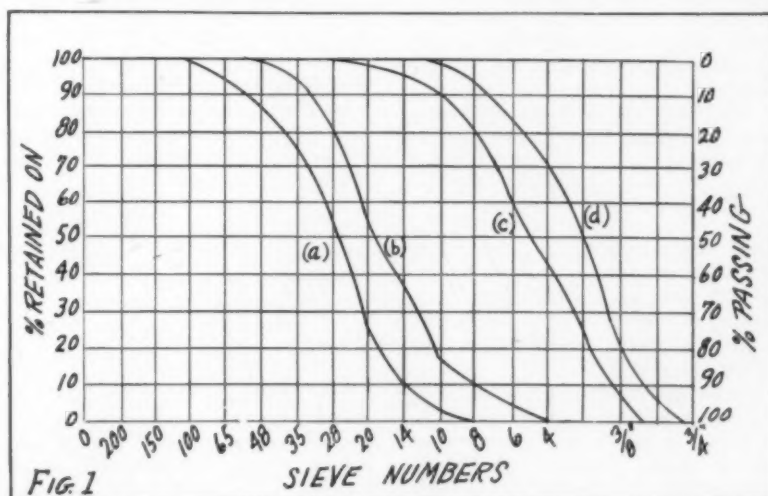


FIG. 1  
Comparison of classifier and screen products, a and b are classifier products, c and d are screen products. Note that curves are similar and nearly parallel

## EDITOR'S NOTE

B. J. ROBERTS, sales manager of the Delster Machine Co., Fort Wayne, Ind., and one of the consultants on this series of articles offers the following comments:

"That part of this article under the heading 'screens and classifiers' could, I believe, be amplified for the benefit of most sand operators. With reference to the first paragraph under that heading, so long as the material must be wet it is much better, from a practical operating standpoint, to screen before drying inasmuch as screening in the presence of water gives a higher capacity per machine, especially in the case of fine screening. This I believe is due in large part to the more rapid stratification of the particles according to size, and also to the force exerted by the water in passing through the meshes.

"In a combination of screens and classifiers the classifier spigot product should be definitely free from undersize, or at least within the tolerance allowed, and then the classifier overflow should be treated on a screen to remove and return to the preceding spigot product all oversize carried in the overflow.

This makes for considerably larger screen capacities and higher efficiency in fine screening, due to the comparatively small percentage of oversize in the feed to the screen.

"With reference to the second paragraph under the above heading, the possible maximum size of particles which can be treated in hindered settling hydraulic classifiers is considerably larger than that stated by Mr. Shaw. Something over twenty years ago I was operating an ore treating plant and wished to cut a jig feed out of an ore stream of a size 9/16 in. by zero. On account of the restricted headroom a screen could not be used, therefore I introduced a hindered settling hydraulic classifier into the line and obtained a jig feed of 9/16 in. by approximately 3/4 in., with the overflow going to a concentrating table. This operation was so successful that they are using a similar arrangement today. I admit I have not seen such a setup in a sand and gravel plant, but as the principle is the same, that is the separation is governed by difference in the weight of the grains, I can see no reason why it would not be successful."

to skim off the lighter materials. Others are straight hindered settling classifiers. These work well with sands, but with coarser materials experience shows that jigs and the machines of the log washer type will do better. Shaking tables have been used, and if they could be made to have sufficient capacity for large operations they should be ideal for the cleaning or concentration of sand.

Beside being used as directly beneficiating sand and gravel, classifiers are used in preparation for other machines. It is a common custom in other industries to use classifiers before tables. This controls the dilution of the pulp going to the table and gets rid of the clay. The clay does not affect the work of the table but it makes it more difficult to see what the table is doing.

It is the intention to describe such uses of classification in detail in later chapters. They are mentioned here to give some idea of the scope of their work. Also to call attention to the nature of their products.

The products of classification of a mixture of two materials of different specific gravities have one common characteristic; large grains of the lighter material are always found with smaller grains of the heavier material in the spigot product.

Advantage may be taken of this to separate the two materials, as is done in coal washing. By passing

the spigot product over a screen, or screens, fairly close separations may be made. One ingenious method of coal washing employs a hindered settling column of a heavy mineral which allows the rock fragments to sink but floats off the coal. Some of the heavy mineral goes down with the rock fragments and this is separated by screens and returned to be used again. Magnetite is generally used.

### Efficiency of Classifiers

The efficiency of a classifier, screen or other separating device is measured by the completeness of the separation it makes. Perfect separation would leave no undersize in the overflow and no oversize in the undersize.

One may use the concentration formula already given in the chapter on washing,

$$E \text{ (efficiency)} = \frac{100c(f-t)}{f(c-t)}$$

The "concentrate,"  $c$ , may be either the overflow or the underflow, according to which has the most of the sizes it is desired to separate. In the formula,  $f$  refers to the feed and  $t$  to the overflow.

As an example, take the work of the cone splitting on 200-mesh, which is shown in No. 3 of the graphs in Fig. 3 (Rock Products, December, 1939, p. 40). The overflow is the concentrate because it has the greatest percentage passing 200-mesh, as it

should have. The spigot contains only 5.4 percent and the feed contains 46 percent. So  $c$  equals 97,  $f$  equals 46 and  $t$  equals 5.4. Substituting,

$$E = \frac{100 \times 97 \times (46 - 5.4)}{46(97 - 5.4)}$$

or 95.8 percent efficiency.

A method which the writer has used, because it gives the percent of the feed in the spigot and overflow, is to set up the following equations,

$$\begin{aligned} ax + by &= c \\ x + y &= 1 \end{aligned}$$

where  $a$  is the percentage of the desired size in the spigot and  $b$  the percentage of the same size in the overflow, and  $x$  and  $y$  are the percentages of the total feed going to the spigot and overflow.

Substituting,

$$\begin{aligned} 5.4x + 97y &= 46 \\ x + y &= 1 \end{aligned}$$

Solving, we get,  $x$  equals 55.7 and  $y$  equals 44.3, the percentages of the total feed in the spigot and overflow.

Then  $44.3 \times .97 = 42.971$ , the actual portion of the 46 percent in the feed going into the overflow. Dividing this by 46 gives 0.935, or 93.5 percent, which is the percentage of the minus 200-mesh material going into the overflow. This practically checks the 93.6 percent found by the other method.

The method of finding the percentages of the feed in the spigot and overflow should not be trusted too far. It is as good as the sieve analyses are correct, but unless very carefully taken they are never 100 percent correct. A size which has only small percentages should never be used for this purpose, and it is better to use the cumulative percentages down to a certain size if possible.

There are other methods of figuring classifier efficiency. Taggart gives one based on the work of Dean, although he says the concentration formula given above is more commonly used. Simmons also gives one. Both give lower efficiencies than the methods given here.

In his new book (McGraw-Hill Book Co.) on "Principles of Mineral Dressing," the author, Prof. A. M. Gaudin, suggests the formula:

$$E = \frac{10,000 (c-f) (f-t)}{f (100-f) (c-t)}$$

This formula overcomes the objection to the more common one above, that it gives a greater efficiency if some of the feed is by passed into the overflow.—THE EDITOR.

(To be continued)

## ROCK PRODUCTS

# Dust Sampling Methods

**Methods and apparatus used to determine dust collection efficiency. To assure accuracy, dust sampling must be done carefully**

**R**EMOVAL OF DUST from kiln stack gases has become so general in the cement industry that information about sampling methods and apparatus for accurately determining dust collection efficiency of the equipment is of timely interest.

An interesting method employed by Buell Engineering Co., Inc., to determine the dust loading carried by flue gas employs apparatus shown in Fig. 1, and consists of a sampling nozzle with means to measure the quantity of gas removed and to extract from the measured quantity

a sample of dust from a flow of gas that the rate of flow into the entrance of the sampling tube shall be the same as the velocity of the gases passing the tube. Not only will the total quantity of solids vary with the velocity of the gases entering the nozzle but the percentage of fines is also affected.

To maintain the same velocity within as without the sampling nozzle and to insure a minimum disturb-

carrying velocities through the apparatus sufficiently high to prevent the dust dropping out of suspension. In this nozzle design, static openings are provided on the inside and outside

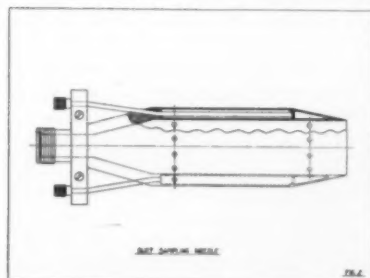


Fig. 2: Details of dust sampling nozzle

without loss, the dust contained therein.

It is very important in obtaining

## CHEMIST'S CORNER

Problems and practices of the chemists in the industry are discussed on these pages. Contributions and comments are invited.

ance at the point of entrance, the nozzle is designed as in Fig. 2. Varying nozzle sizes are necessary so that with low velocity gas, the amount sucked through the apparatus will always be sufficient to maintain

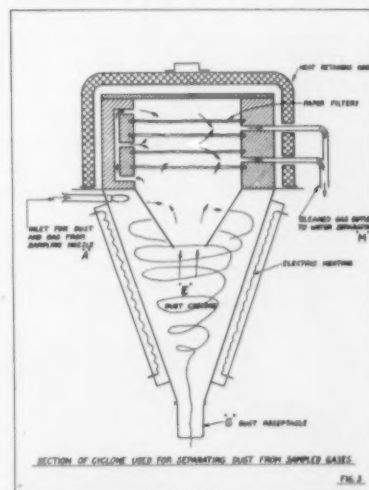
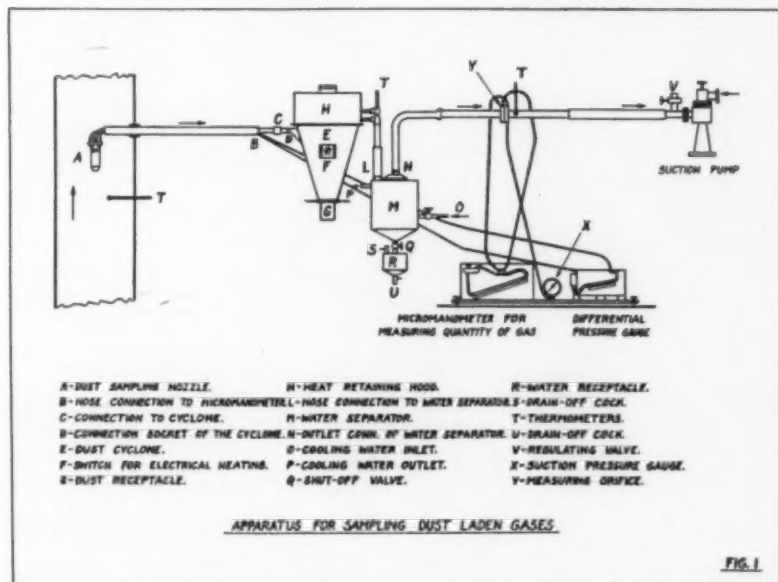


Fig. 3: Sample of gas together with its contained dust is fed into a small collecting cyclone

of the tube. These openings are connected to a differential pressure gauge arranged on the instrument board of the apparatus and, if the static pressures inside and outside are maintained at the same level, the flow into and the flow outside the nozzle will be the same. In an actual test, the flow in the Rosenmueller nozzle, as it is called, is adjusted by increasing or decreasing the suction of the gas pump by opening or closing the regulating valve "V".

## Placing of Sampling Nozzle

Care must be exercised in placing the dust sample nozzle to obtain the best possible straight line flow. Theoretically, assuming a circular duct, there should be at least a five-diameter length before and a five-diameter length after the nozzle. Practically, the sampling location is selected at a point where the variation in velocity over the cross-section of duct is within reasonable limits. Another very important requirement is to see that the cross-sectional area



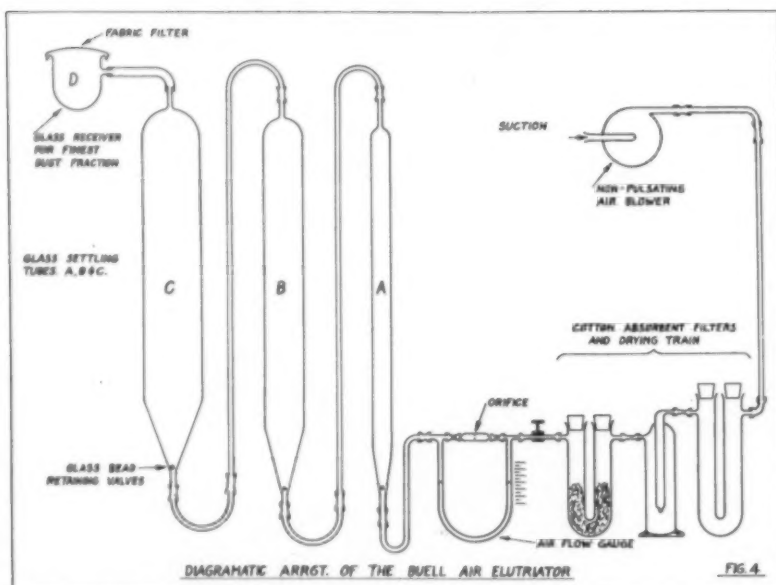


Fig. 4: Diagrammatic arrangement of the Buell air elutriator

of the duct is divided into sections so that with a sample from each, a representative cross-cut of the gas flow and dust is obtained.\*

With the Rosenmueller equipment, the sample of gas together with its contained dust is fed tangentially into a small collecting cyclone, (E) in Fig. 1 and in greater detail in Fig. 3. In the cyclone proper, the coarser dust falls to the dust receptacle (G), while the finer dust together with the entraining gas passes upward into the paper filter section. At this point, all the dust remaining is filtered out, the cleaned gas passing on to the water separator or condenser (M). It is preferable with the paper filter to hold down the gas temperature to 180 deg. C.

Before measuring the gas quantity in order to determine the dust concentration, the water vapor, if any, carried in the gas is removed in the water separator or condenser (M) through which is circulated cooling water entering at (O) and leaving at (D). The vessel (R) just underneath (M), has a special valve arrangement so that the condensate may be drawn off at intervals without interfering with the flow of gas through the apparatus. The condensate is weighed so that its equivalent volume as water vapor may be calculated. With the water condensed out, the sample of saturated gas is at a temperature somewhat lower

than the actual temperature at the point of entrance into the sampling nozzle, therefore, a temperature reading is taken at the measuring orifice (Y) so that the decreased volume may be calculated back to the original volume as existed at the point of sampling. The orifice and the tube leading to and from is electrically heated so as to maintain the gas at a temperature above the dew-point. Electrical heating is also applied to the sampling nozzle tube and the

cyclone (E) in cases where the gas sampled approaches the dew-point at the point of sampling.

In an actual test, readings are taken every 5 minutes from which, with a knowledge of the gas conditions at the point of sampling and at the point of measurement in the apparatus, the volume pulled through in a given time can be calculated together with the weight of the dust carried. The figure obtained represents the dust concentration and is usually expressed in grains per cubic foot.

### Grading Analysis of Dust by Air Elutriation

It has been found that a particle falling under the action of gravity in still air quickly attains a definite velocity and then continues to fall at this velocity. This terminal velocity, as it is called, is a function of the size of the particle; the smaller the particle, the slower the speed. It will be appreciated, therefore, that if a small quantity of solid matter of various sizes were to be placed in an upward current of air, some particles, whose size were such that the terminal velocity which they would attain under gravity in still air were equal to the velocity of the upward current of air, would remain in suspension in the upward current while particles whose size were greater would fall and the remainder whose

(Continued on page 32)

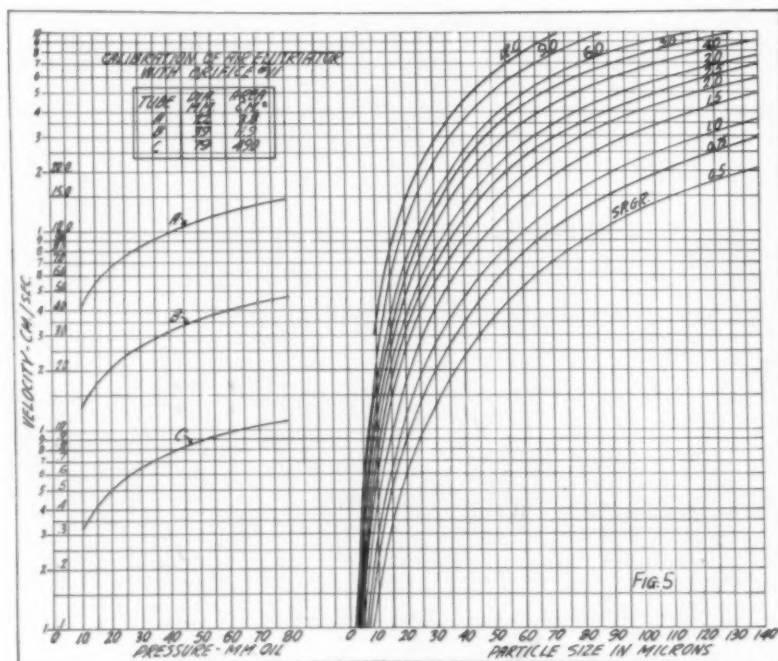


Fig. 5: Air elutriator calibration curve

\*An article describing an accurate method of taking flue gas samples, "Testing Flue Gases," by Hudson H. Bubar, appeared in Rock Products, August, 1938, p. 56.

# X-RAY SOLVES MYSTERY?

Some interesting discoveries concerning plasticity of hydrated limes have been revealed by X-ray studies

By NATHAN C. ROCKWOOD

I AM TAKING OVER Victor J. Azbe's "Lime Forum" for this issue to tell something of his newest enthusiasm. Intrigued by a paper read at a symposium on lime at the convention of the American Chemical Society at Richmond, Va., in 1927 by Dr. Marie Farnsworth, Mr. Azbe has been ever since flirting with the possibility of learning more about lime through the use of X-ray. He was a speaker on the same program with Dr. Farnsworth, and at that time just beginning to get interested in the whole subject of lime and lime manufacture.

Recently Mr. Azbe has been successful in getting the coöperation of

Dr. C. L. Clark, professor of chemistry, University of Illinois, and Dr. W. F. Bradley, of the Illinois State Geological Survey, both experts on X-ray analyses, for quite a comprehensive X-ray study of limes. While the study is by no means complete, it has gone far enough for the investigators to draw some very interesting tentative conclusions.

The secret of plasticity appears to be in the shape of the particle or crystal of hydrated lime. When these crystals are flakes, that is flat to the extent of a ratio of 1 to 10 in thickness to length, the material is plastic. In other words the so-called plasticity of hydrated limes is more

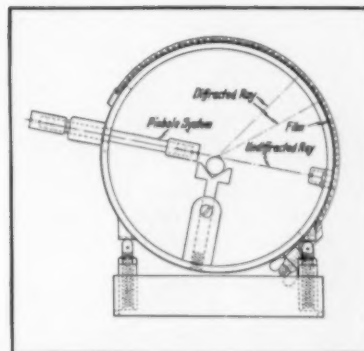


Fig. 1: Cross-section through X-ray exposure tube showing how ray is used on a pulverized sample of lime

related to the *spreading capacity* of paint pigments than it is to plasticity or flowability of clays. It has long



Fig. 2: General Electric X-ray diffraction apparatus used in the study

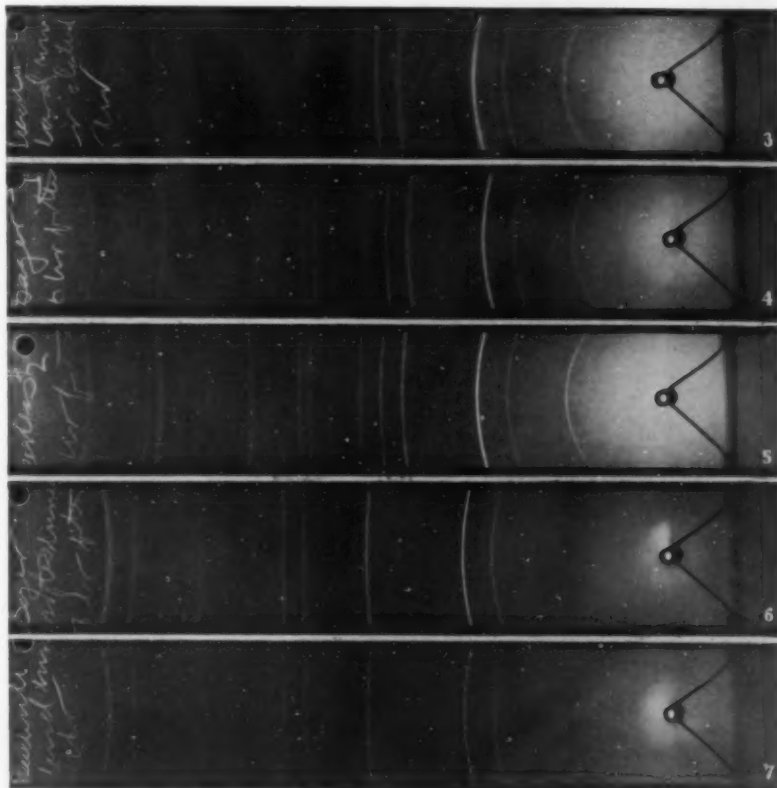


Fig. 3: Diffraction photograph of a lime hydrate made by air slaking. Fig. 4: A good commercial plastic hydrate. Fig. 5: A not so good plastic hydrate. Fig. 6: Diffraction pattern of a soft-burned lime; small crystals or particles. Fig. 7: Diffraction pattern of a hard-burned lime; larger particles, hence not such sharp definition

been known that flakey pigments have the most spreading capacity.

Without going into a scientific explanation, it can be said that a beam of X-ray passing through a crystal is diffracted or bent by the various planes of the crystal just as a ray of sunlight is diffracted in passing through a larger crystal of glass. This diffraction pattern, registered on a photographic film, permits an X-ray expert to draw many conclusions as to the shape and size of the crystals, as well as to identify chemical compositions.

Samples of all sorts of lime were X-rayed. A particular study was made of the discolored film on lime. It turned out to be composed of anhydrite  $\text{CaSO}_4$  (gypsum) formed by the absorption of hydrogen sulphide and sulphur dioxide from the fuel burned.

Samples of lime burned at carefully measured temperatures and for

measured lengths of time were investigated to see what effects high temperatures and long exposures had on the resulting lime. The conclusion was reached that if the lime were pure—that is, if there were no impurities to fuse with the lime—the degree of burning need have no effect on the resulting hydrated product so far as plasticity and other properties were concerned.

When lime, either hard or soft burned, was air-slaked, or slaked without heating, the particle or crystal size and shape was always about the same. What did determine the particle size and shape of the hydrate was the amount of heat generated in the hydration. As a result of this phase of the study, Mr. Azbe has designed a hydrator to have control of temperature and avoid overheating of the hydrate. For it was shown that the cooler the hydration, the smaller and flatter were the crystals of hydrate. Air-slaked lime crystals were found to be 1/10 the size of the smallest commercial hydrate crystals.

The investigators also concluded that it made no difference whether the lime was high calcium or dolomitic. The plasticity in either case, they are convinced, is to be attributed to the flakey crystals of calcium hydrate  $\text{Ca}(\text{OH})_2$ —and not to some virtue derived from any magnesium composition in the product. In every case of a commercial dolomitic hydrate, the X-ray showed unhydrated magnesite ( $\text{MgO}$ ). It is desirable, however, to hydrate the magnesite, because its hydrate,  $\text{Mg}(\text{OH})_2$ , tends to form even more flakey crystals than  $\text{Ca}(\text{OH})_2$ . This probably accounts for the advantage gained in "soaking" magnesium lime putties.

The primary reason why magnesium hydrates are apt to be more plastic than high calcium ones, according to the investigators, is merely because they are normally hydrated at lower temperatures. The magnesium oxide acts as a dilutant. There is not so much  $\text{CaO}$  to hydrate, the particles of  $\text{CaO}$  are more or less insulated or distributed, so that high temperatures of hydration are avoided. Whether correct or not, this theory is new and novel. It should not discourage the magnesium lime manufacturer, but rather inspire him to find ways to hydrate the  $\text{MgO}$  as well as the  $\text{CaO}$ .

The flat, scaly or flakey particles that give hydrated lime plasticity are of greater value than providing spreading or covering capacity to finishing plaster or to mortars. Particles of such shape also have the largest surface area and therefore

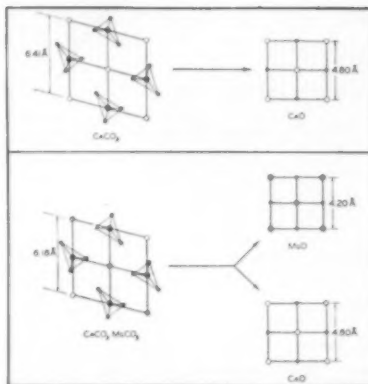


Fig. 8: Crystal patterns of lime and limestone

provide the quickest and most complete chemical reactions. They make the lime more available, reactive, soluble, slow-settling.

The instruments used in this X-ray study and some samples of the X-ray photographs are shown in this article, but for those readers who want to know more about the scientific methods involved we refer to a paper now awaiting publication by the American Chemical Society: "Problems in Lime Burning—A New X-Ray Approach," by G. L. Clark, W. F. Bradley and V. J. Azbe.

## Dust Sampling Methods

(Continued from page 30)

particle sizes were smaller would ascend. An elaboration of this principle is used in the air elutriator, Fig. 4, which is used for grading a sample of solid matter down to very fine sizes.

In a grading analysis obtained by air elutriation where the material graded has a uniform particle shape and where the individual particles are homogeneous, such as crushed quartz, the material would be graded to a definite particle size but with a mixed sample of various substances, such as solid matter in stack gases, the grading would be to fractions having the same rate of fall under the action of gravity. The rule set out above is a very important one, and in the future regulations for dust control may be based on settling velocities rather than particle size.

Fig. 4 shows the air elutriator. To make a running test with the air elutriator, it is necessary to determine the specific gravity of the dust, using a specific gravity bottle with a long neck so that the dust can be completely freed from air under the influence of a vacuum without

danger of dust loss in the ebullition caused by the escaping air.

Having the specific gravity, reference is made to the calibration chart, Fig. 5. Given a specific gravity of 2, a dust particle of 30 microns would have a settling velocity of 5.4 cm. per sec. in settling tube (A), while a dust particle of 20 microns would have a settling velocity of 2.6 cm. per sec. in settling tube (B), and a dust particle of 10 microns would have a settling velocity of 0.58 cm. per sec. in settling tube (C). The pressure, in millimeters of oil given on the bottom line is used to determine the air flow necessary through the instrument for effecting settlement in tubes (A), (B), and (C) fractions with a required settling velocity. After placing the sample of dust in tube (A) through a funnel inserted in the top by removing the connecting limb between settling tubes (A) and (B), the air flow gauge is set for the requisite pressure to give the desired velocities in the tubes. In the meantime, a fresh fabric filter will have been weighed and placed in position on the glass receiver at the outlet of the apparatus.

With everything in readiness, the air blower is started up and the flow regulated to the desired quantity by a pinch tube press with air passing through the instrument. Separation of the sizes immediately begins to take effect and dust from (A) passes to (B) and from (B) to (C) and from (C) to the glass receiver at the outlet. Complete elutriation of an average dust sample takes about 8 to 9 hours, and during this period the apparatus must be rapped, at intervals, to prevent build-up of dust in the tubes and to give agitation to separate agglomerates caused by moisture or otherwise. Completion of the separation is adjudged by clearance of the tubes and completion of flow between settling tubes. At this point, the air blower is shut down and the samples extracted for weighing and microscope check. Four fractions in all are obtained, one each from (A), (B), (C), and glass receiver, (D), the fractions increasing in fineness from (A) to (D). From the settling velocities and the specific gravity of the dust, the corresponding particle size in microns, assuming a homogeneous material may be calculated according to Stokes Law or taken from the chart, Fig. 5.

The apparatus described is simple to use, and also takes into account the lack of homogeneity which prevails with stack dusts.

**CEMENT**

**LIME**

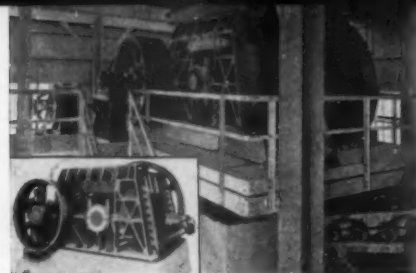
**GYPSUM**



The **PENN-PRIMARY** hammermill with dump hopper and feeder, combines the primary and secondary reduction of cement-making material, at minimum building, foundation, rehandling, power and maintenance cost. (Patented) Bulletin No. 1020.

# PENNSYLVANIA STEELBUILT CRUSHERS

## "PENNSYLVANIA"



**PENN-LEHIGH** series single roll crushers are specialized equipment for the primary reduction of cement-making material, limestone and gypsum rock, —dry, *DAMP* or wet. (Patented) Bulletin No. 2003.

# REVERSIBLE STEELBUILT HAMMERMILLS

Specialized for the Secondary Preparation of Primary Products for Efficient Grinding

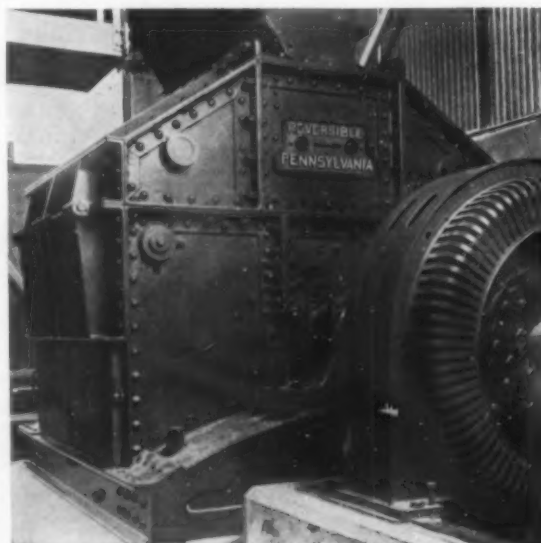
## Reversible Operation

**MONDAY  
RIGHT HAND**

**AUTOMATIC HAMMER  
TURNING**

**TIME-TESTED  
TRAMP IRON  
SEPARATION**

**REDUCES  
POWER DEMANDS  
PER TON**



Pennsylvania Reversible Hammermills, with high drop, central feed of primary crusher product, effect major initial reduction by smashing head-on impact between the faces of the hammers and the heavy anvils which overhang the primary crushing zone. Remaining oversize is reduced over the cages and the product,—nominal 1", 3/4", 1/2" or 1/4", as specified,—notably improves the efficiency of the grinding operation.

Improved adjusting mechanism permits the maintenance of close concentricity of cage and hammer circles, imperative for sustained uniformity of product.

Symmetrical wear on internal parts, resulting from daily reversals, together with quick accessibility, sharply reduces upkeep costs.

Twelve (12) Steelbuiltsizes afford capacity range of from 600 to 25 tons hourly.

Installations reflect the industry's reception of this notable hammermill development.

"Pennsylvania" Engineers are at your service.

Put Your Raw Side Reductions Up To Us

GENERAL OFFICES  
Liberty Trust Bldg.,  
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**PENNSYLVANIA  
CRUSHERS**

"Pengerush" Philadelphia

Cable Addresses

Associated with  
Fraser & Chalmers Eng.  
Wks., London  
Offices throughout the  
world

"Vanner" London

## Reversible Operation

**TUESDAY  
LEFT HAND ETC.**

**AUTOMATIC  
RESHARPENING OF  
HAMMERS AND  
CAGE BARS**

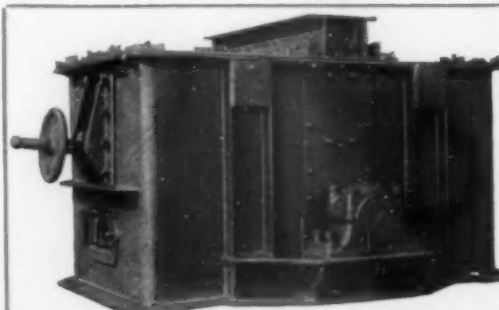
**INCREASED CAPACITY  
AND FINENESS**

**SHARPLY CUT  
MAINTENANCE  
COST**

"Pennsylvania" Steelbuilt Reversible Hammermill is fine smaller sizes, specialized for fine uniform preparation of limestone, lump lime and calcined gypsum rock for processing. (Patented) Bulletin No. 1024.



"Pennsylvania" Steelbuilt Reversible Impactor,—the advanced type for preparing road chips, aggregates, artificial sand, refractories, etc. **BY IMPACT**, without attrition, to "premium" particle form, at reduced cost for maintenance and power. (Patented—patents pending) Bulletin No. 6000.



# Developments and Trends In Cement, Lime and Gypsum

By NATHAN C. ROCKWOOD

**F**OR THE FIRST TIME in several years there has been an appreciable increase in productive capacities in the American cement, lime and gypsum industries. These industries have invested probably 15 to 20 million dollars in 1939 in new productive facilities—new plants, additions to older plants and complete rebuilding of old plants. Most of this new capital has come out of earnings, for, with the exception of one cement plant and one or two gypsum board manufacturers, there have been no issues of new securities in large amounts.

The increased production of all these basic building materials appears to be accounted for chiefly by the larger volume of residential construction. There is every indication that this market will expand further in 1940; and there will be more commercial and industrial building in 1940 than in 1939. The demand for portland cement seems to have taken an important trend toward pre-depression normals, after a decade in which public works construction has been the dominant source of demand. This will be less a factor, in all probability, in 1940 than in 1939.

## Cement

With increasing production of portland cement (about 20 percent increase in 1939 over 1938) manufacturers are getting an awful headache as a result of the numerous specifications they are being called upon to meet. Manufacturing problems are not so difficult, but separate storage and handling facilities are "a pain in the neck" to an industry originally designed to manufacture a single standard product in large volume at low cost.

It does not appear that we shall return again, soon, to one standard portland cement. P. H. Bates, expert of the National Bureau of Standards, says we need four varieties, two of which may be combined in one (Rock Products, August, 1939). The trend is, however, to get all the raw materials from the old deposit rather than to go far afield for them.

For the outstanding development in portland cement manufacture in 1939, though not heralded, is probably the progress made in extending the froth flotation process to vary the proportions of minerals found in the common pulverized rocks and clay used for cement manufacture. The original Breerwood studies and patents in this field covered the concentration of calcium carbonate. New studies, new flotation agents and new patents (issued in 1939) cover flotation of cement raw materials to concentrate the silica ingredient instead of the calcium carbonate (limestone). The purpose in general is to reduce the alumina content and improve the silica-alumina (+ iron oxide) ratio so that the cement will meet the newer specifications, for high silica and low alumina.

These new processes are greatly extending our knowledge of what may be done with cement raw materials and point not only to more accurately proportioned oxides, but to economies in grinding, since nothing is gained by grinding finer than necessary to effect the desired mineral separation, before the unneeded part of the mix is discarded. The new developments have made it possible to treat some of the Lehigh Valley natural cement rocks which were difficult to handle by the limestone concentration method only. One Lehigh Valley plant installed the flotation process in 1939 and another is reported prepared to do so.

The Permanente Corp.'s new plant, about ready for production in Santa Clara County, Calif., utilizes the flotation process to get rid of an excess of chert in the native limestone. It is said that this deposit of limestone had frequently been turned down as raw material for cement manufacture by earlier prospectors and promoters because of the excess of chert and want of uniformity. Without the perfection of the flotation process it probably would have been practically impossible to make government specification portland cement from this raw material. The trend as influenced by the further

development of the flotation process is greatly to extend the possible sources of raw materials.

Mechanical developments in portland cement manufacture in 1939 appear to have been chiefly in much greater use of dust collectors, more interest in and use of clinker coolers of the air-quenching type and rather novel developments in kiln control. Mechanical type dust collectors are making inroads on electrical precipitator types for stack dust, but on the other hand at least one company installed an electrical precipitator for dust collection on clinker finish grinding mills—probably the first such installation.

Greater utilization of waste heat from the kiln appears to be in the offing—that is use other than for waste heat boilers. Devices for using waste kiln gases to preheat the raw materials are in various stages of development. The Santa Cruz Portland Cement Co. is installing Lepol kilns, which have preheater attachments as a main feature.

We see other possibilities in cement manufacture to make use of more waste heat. In the air-quenching type of clinker cooler more heat can be recovered from the clinker than can be used for primary and secondary air for combustion. That now wasted, while of relatively low temperature, might be used to supply warm air for dust collector installations to prevent condensation in ducts and consequent setting of the dust or cement, which often gives trouble in some dust-collector installations. One of the copper smelters in Arizona now uses the molten slag to heat water tube boilers. It seems entirely possible to use the hot air blown through a bed of cement clinker in a similar manner, or at least for preheating boiler water.

Some new cement specifications call for quite high percentages of silica; but lime and silica do not clinker readily in dry heat at the highest feasible kiln temperatures. Some flux or catalyst is needed. Hence the use of alumina, iron, etc. Other mineralizers are possible

(Continued on page 60)

# Giant's New Direct-Firing Coal Mills

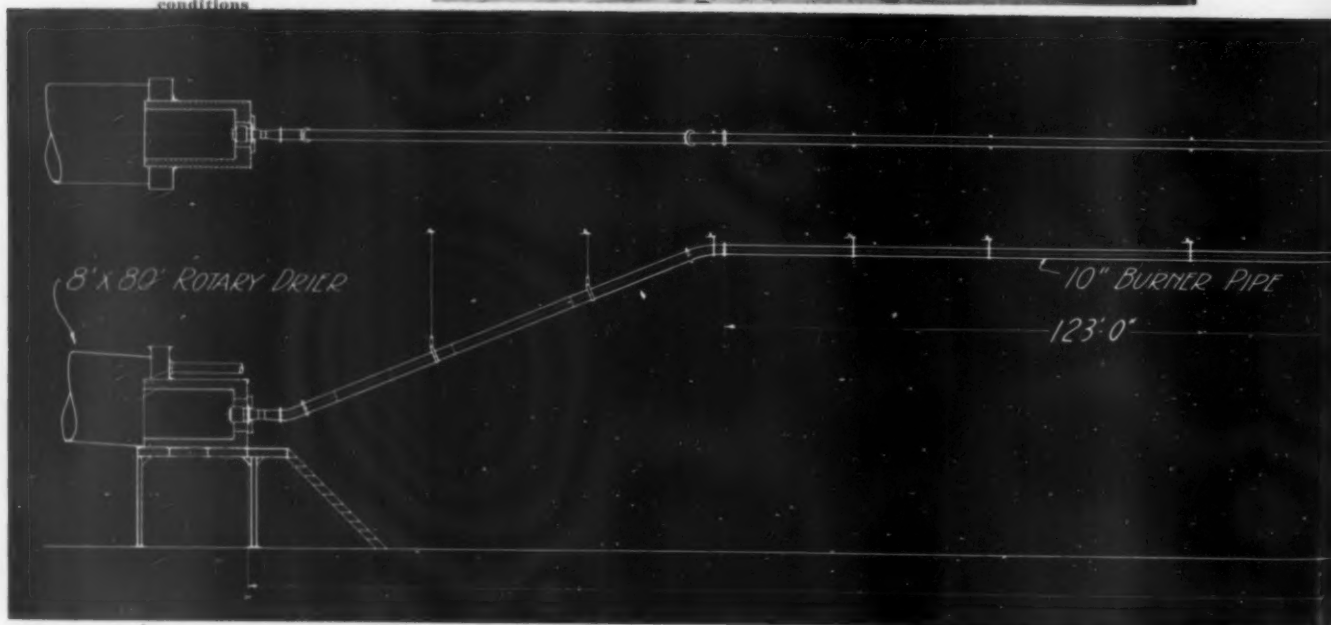
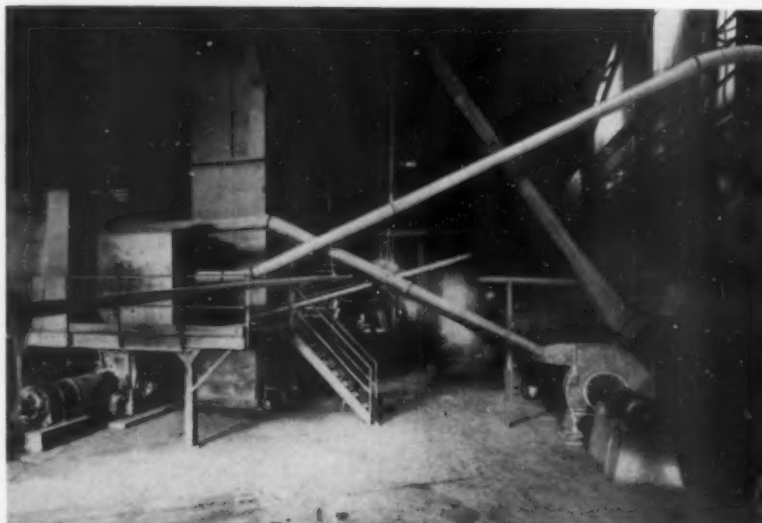
Waste heat is utilized to dry the coal while it is being pulverized in the mill and the pulverized coal is "shot" at the rate of about 1000 lb. per hour through a 10-in. burner pipe, about 200 ft. in length, into the dryer. The pipe extends from the kiln room up and over the kilns, thereby

Above: Showing a unit coal mill firing a cement kiln, a practice which is becoming more general in the industry

Right: Unusually long burner pipe used in firing an 8- x 80-ft. rotary rock dryer

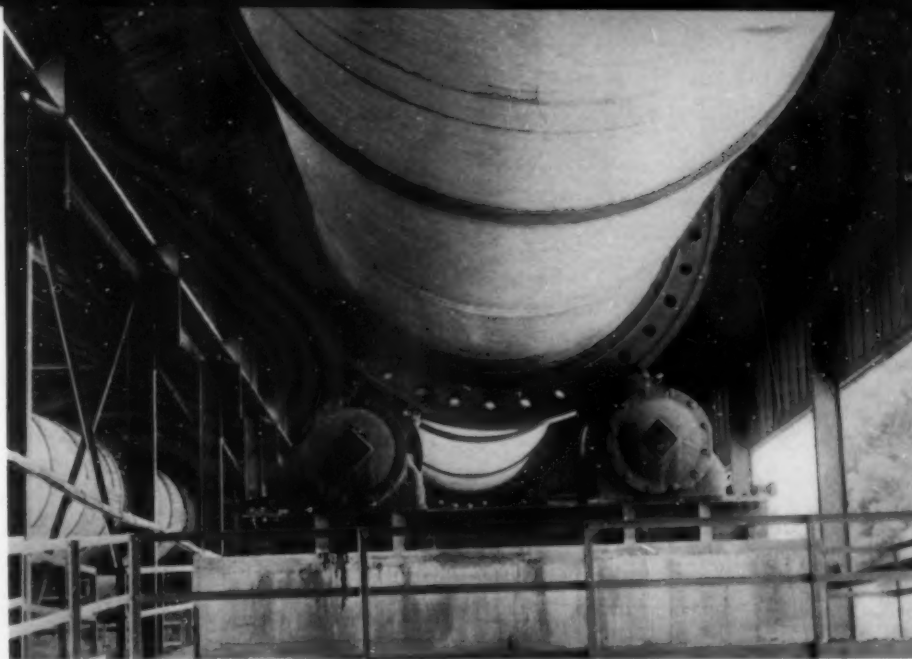
UNUSUAL installation of direct firing equipment is illustrated here-with in the plant of the Giant Portland Cement Co. at Egypt, Penn. The drawing and one of the photographs illustrate what is probably the longest burner pipe in the cement industry, used in firing an 8- x 80-ft. rotary rock dryer from a B-10 "Unipulvo" unit coal mill manufactured by The Strong-Scott Manufacturing Co.

Below: Drawing of long burner pipe installation for rock dryer illustrating the flexibility of the direct-firing coal units in meeting difficult installation conditions



# All-Welded Rotary Kilns For Lime

utilizing heat radiated from the kilns in preventing condensation within the pipe. Another view shows a Strong-Scott mill firing a cement kiln, a type of coal mill first introduced to the cement industry at the Kosmos plant, Kentucky.

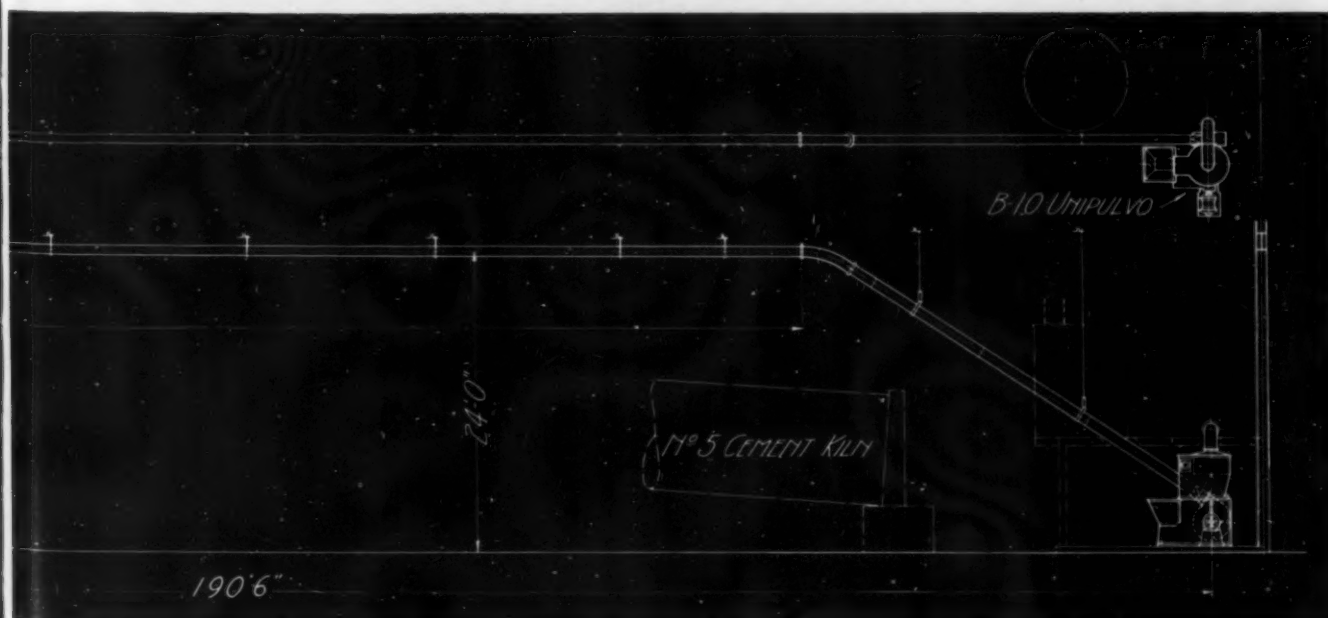


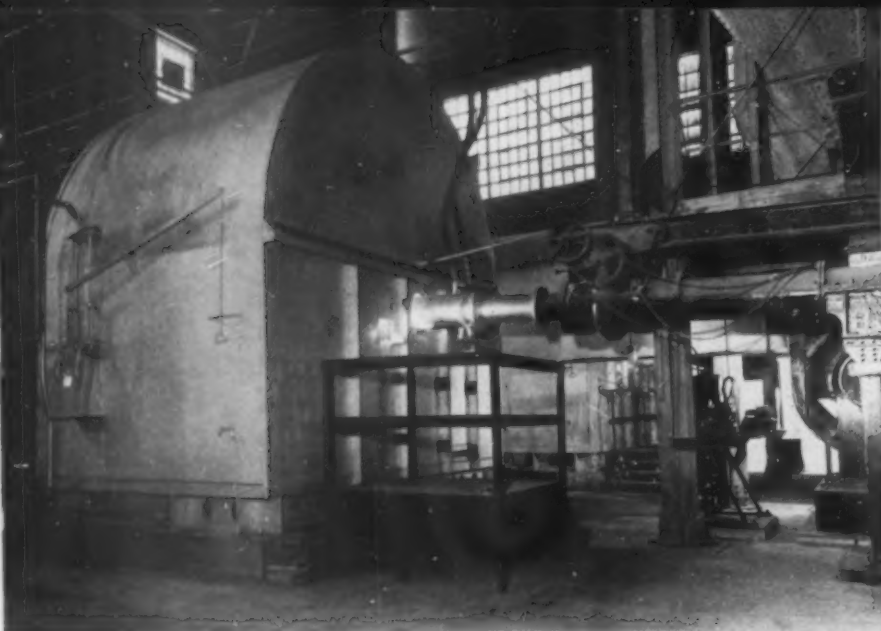
Above: All-welded rotary lime kiln, showing new flood oil lubricated carrying mechanism which facilitates starting



ONE OF the outstanding developments of recent years has been the unmistakable trend to the use of all-welded rotary kilns. Less dead weight and greater strength are claimed for the all-welded Allis-Chalmers kiln. Along with this development, the flood oil lubricated carrying mechanism has been introduced to lighten the starting load.

Left: Thrust mechanism, two-roller type, with forged steel carrying rollers and flood oil lubricated, water-cooled bearings with auxiliary oiling wheels. Thrust rollers are designed to carry entire thrust of kiln





Left: Hood of one of two kilns equipped with air-quenching grate coolers at Keystone. Clinker discharges through a vertical chute into the cooler which is in a tunnel below the kiln floor

## Clinker Heat Recovery

**C**LINKER COOLING progressed in 1939 with growing appreciation of the possibilities of heat recovery from this source as well as insurance against unsound cement. The installation illustrated here, at the Keystone Portland Cement Co. plant, Bath, Penn., is typical of several made in the Lehigh Valley using the cooler developed by the Fuller Co. and originally tried out at the Valley Forge Cement Co.'s plant.

These coolers are of the air-quenching type with air forced through a thin bed of clinker as the clinker flows uniformly down an incline over reciprocating and stationary grates. Cooling air is forced through the clinker bed in horizontal and vertical directions. Part of the cooling air enters through the clinker

bed at the upper end of the cooler and the preheated air is used to support combustion in the kilns. The remainder of the air is put through the secondary portion of the grate to reduce clinker temperatures further as an aid to more efficient grinding.

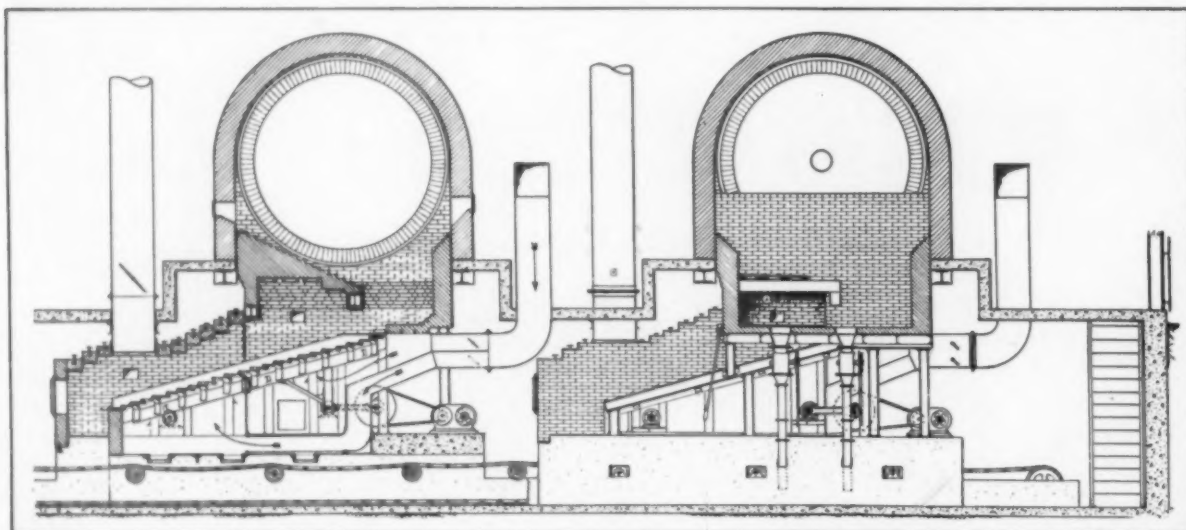
Some cement mills have gone to extremes in recent years in conditioning cement clinker for grinding. We know of at least one plant that has installed air-quenching coolers that bring clinker temperatures down to about 12 deg. above atmospheric temperature. Every degree of temperature reduction possible with

Two coolers installed at right angles to the kilns at Keystone Portland Cement Co. Each unit is a combined air-quencher and recuperator with a flann cooling section

reasonable investment was considered desirable to make the clinker more grindable. A combination of forced air and suction is applied to the clinker bed as it is carried over a long grate.

## Weighing Controls

**MORE RECOGNITION** is being given to the importance of regulated feed and accurate proportioning of materials into various units of equipment used by the cement industry. A typical example of the close control maintained in the proportioning by weight of rock and shale as well as clinker and gypsum into grinding mills is shown in the illustration of the Jeffrey-Traylor Waytrols on the opposite page. These feeders are handling and proportioning rock and shale into a bucket elevator which in turn discharges into a B and W grinding mill. Proportioning is maintained automatically by this type of equipment. The units directly beneath the feeder are weigh belts which in turn control the vibrating feeder. These weigh machines are controlled not only by weight but also by the amperage of the grinding mill. The principle of feeding by vibration is finding wider acceptance in other types of rock products plants as well as in the cement industry.

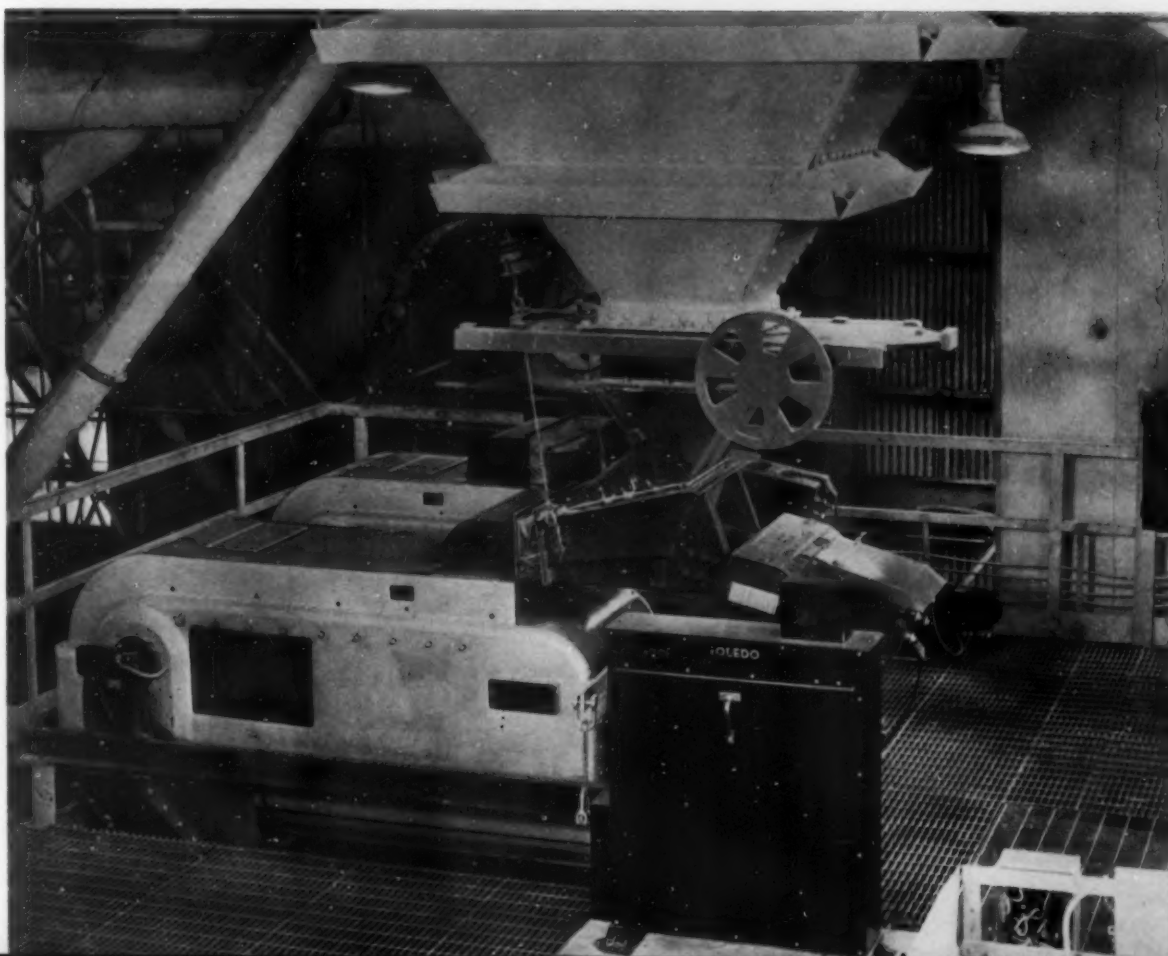
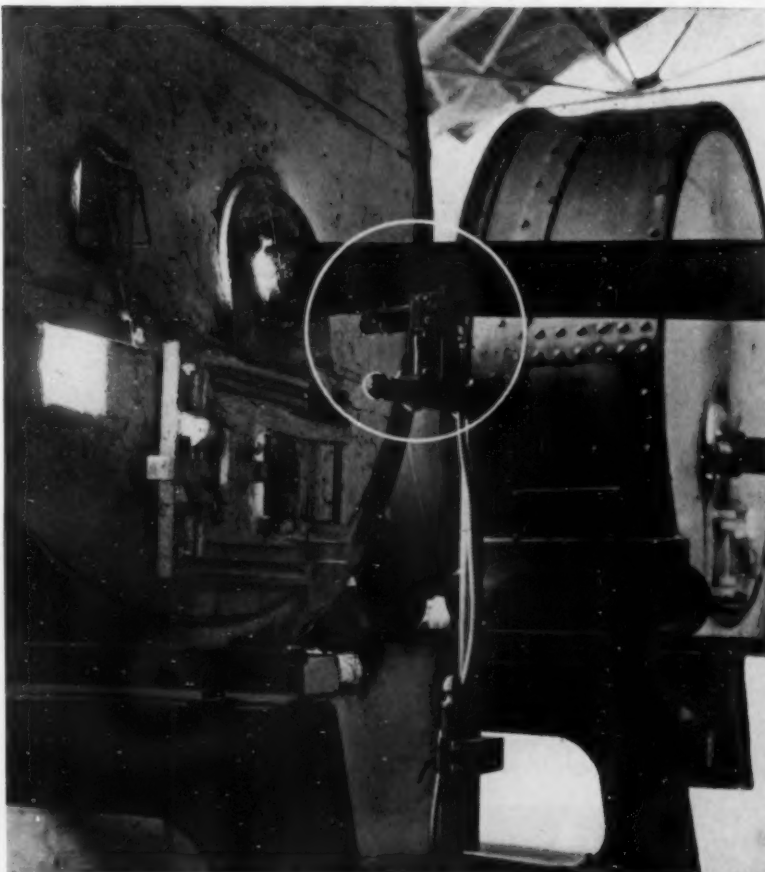


Phototube pyrometer, circled, on one of the kilns at Fogelsville, Penn. The tube is focussed on the brink of the clinker cascade as it leaves the flame

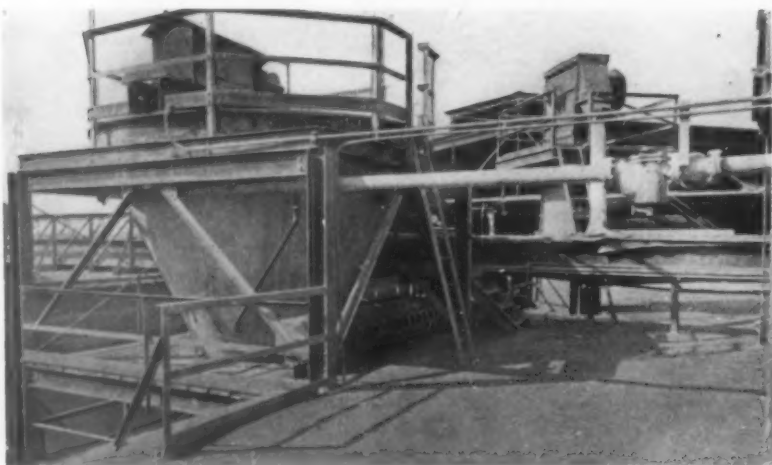
## Electric Eye

STARTLING new use of the photoelectric cell, or phototube, was developed by General Electric Co. in 1939 and used on the kilns of the Lehigh Portland Cement Co., Fogelsville, Penn., plant. Focused on the clinker cascade as it emerges from actual contact with the flame, it measures and records the clinker temperature by changes in the radiant energy (light) and it does more than that, for the current variations operating through amplifiers and contactors, automatically controls the rate of revolution of the kiln and rate of feed into the kiln. Every year sees some progress toward elimination of rule of thumb and human factors in control of cement manufacture.

Feeding devices which automatically proportion and regulate the feed of rock and shale into a grinding mill



# COOLING CEMENT AND CLINKER



**C**LINKER COOLERS are becoming more simplified. In the illustration may be seen an F. L. Smidth & Co., Zonax pre-cooler attached to the outlet end of a rotary kiln.

It will be noted that the pre-cooler, located immediately in front of the hood and integral with the kiln, is a relatively small section. The Zonax

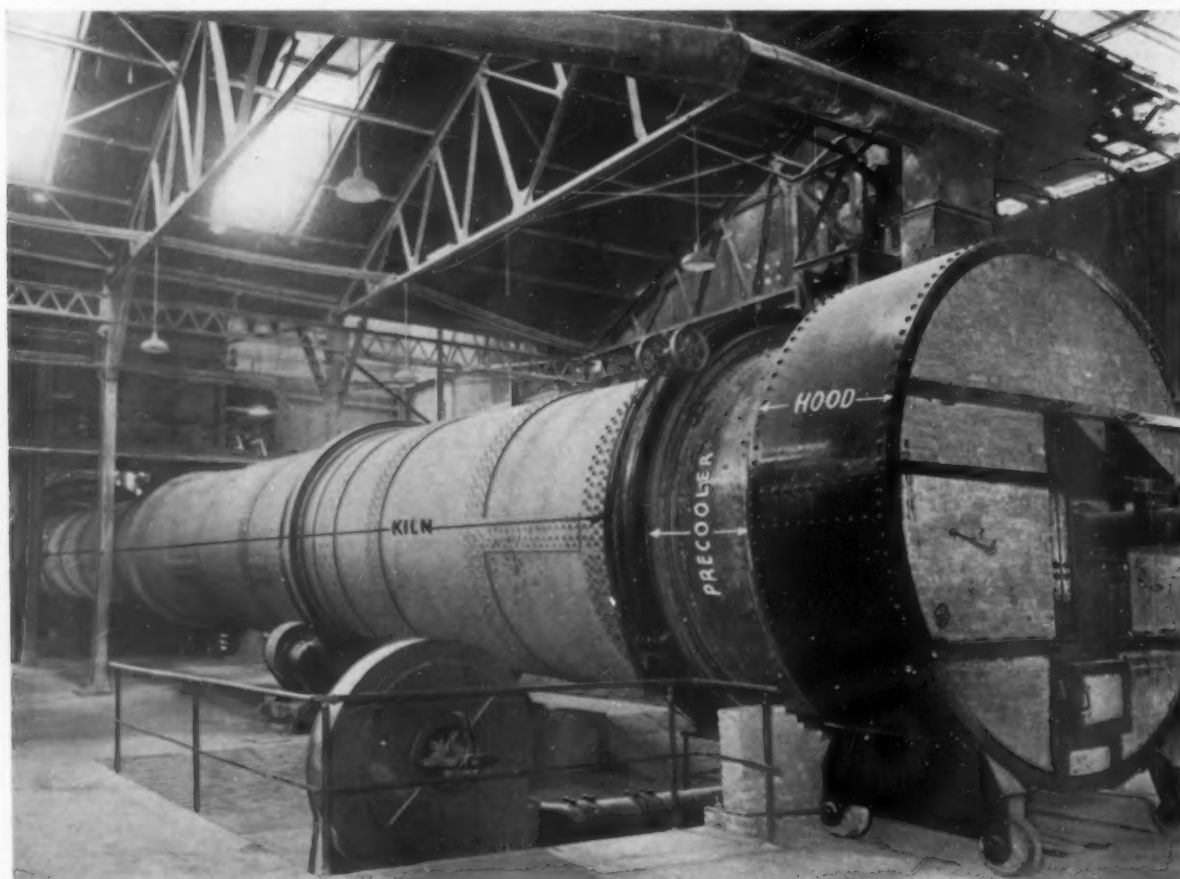
cooler consists of a number of grate sector castings mounted annularly inside the kiln shell, these sector castings being arranged in connection with partitions so that air can

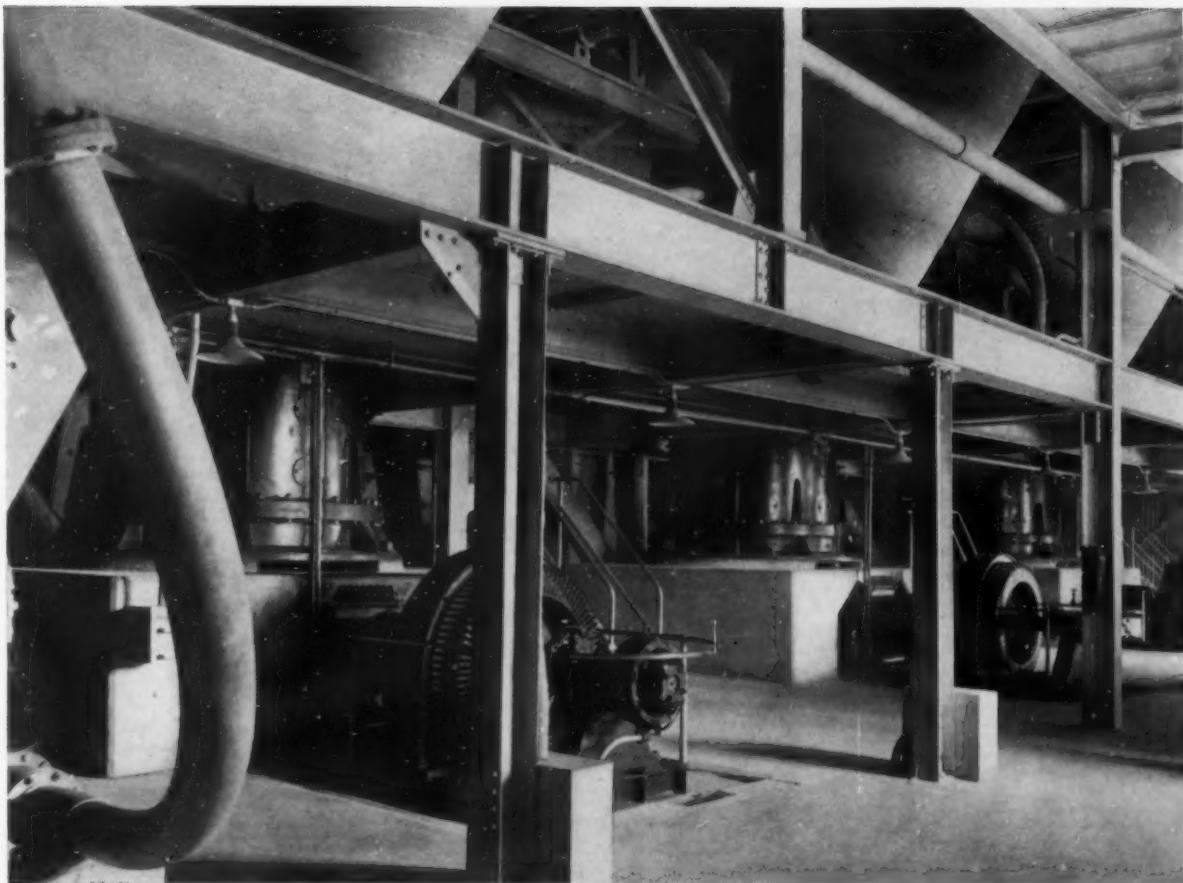
Below: Installation in cement plant of new type pre-cooler which is integral with the kiln shell

be admitted to the sector castings over which clinker bed is located.

The openings in the kiln shell are surrounded by a stationary mantle supported by means of anti-friction bearing equipped rollers, which roll on the shell. The mantle is so arranged that the position of the points of air admission to the grate sector castings can be adjusted to conform with various locations of the clinker bed. Rotation of the mantle around the cooler is prevented by means of a turn-buckle. The cooling air is supplied by means of a fan and duct arrangement.

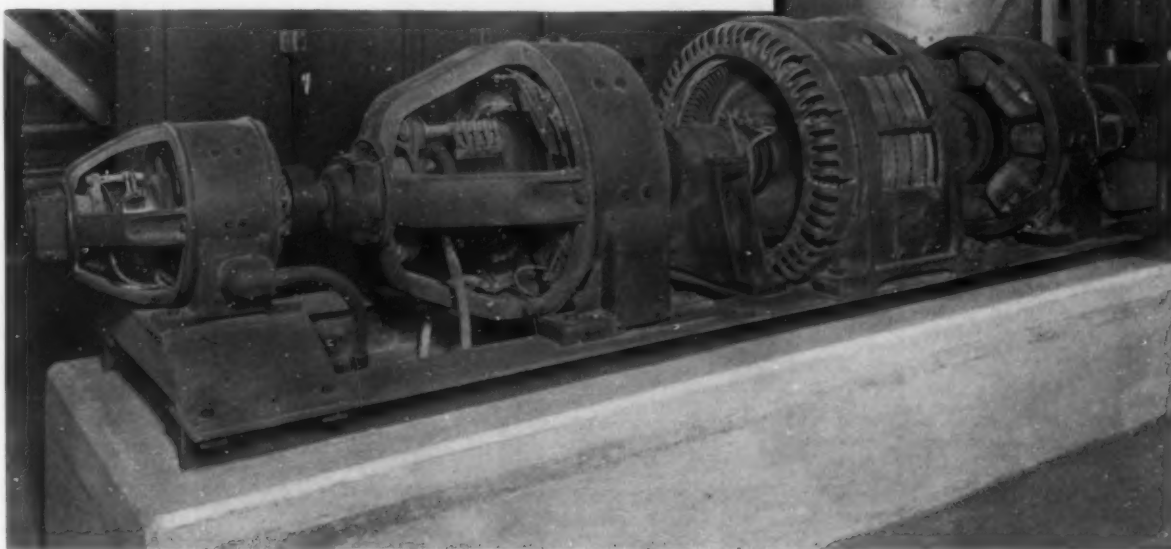
Above: Louisville Cement Co., Speed, Ind., has found it advantageous to cool the cement quickly in taking cement directly from the finish mills for bulk loading during the summer months. The cooler, an F. L. Smidth & Co. machine, receives the cement from the screw conveyor conveying the product from the finish mill, an adjustable slide valve in the conveyor housing releasing any desired part of the cement stream into a pneumatic feeder serving the cooler. A continuous film of water moving over the outside of the cone of the cooler takes up the heat passing through the shell





Above: Raw material grinding department as used by Universal Atlas Cement Co. at Hudson, N. Y. This is the first installation in the United States where heat is applied simultaneously with the grinding without use of auxiliary drying equipment. Grinding equipment similar to these type B, size 360 B & W mills has just been installed in another eastern cement mill

Below: Synchronous motor-generator set for driving two cement kilns and their feeders under adjustable voltage. A d.-c. generator is provided for each kiln. This arrangement is said to provide ideal starting conditions and flexible control. It is one of the latest answers to that old, old question: Which is best for kiln drives, d.-c. or a.-c.?



## EVOLUTION IN QUARRY HAULAGE



**E**volution in quarry transportation is the meaning of these views at the Coplay Cement Manufacturing Co. operation, Coplay, Penn. First we have industrial railways, then motor trucks and now belt conveyors. The motor trucks (Hug "Roadbuilders" with Buda Diesels for power, and equipped with Easton Phoenix side-dump bodies) are not eliminated in the new setup, but their haul is shortened. The crusher was moved into the quarry and the crusher product is delivered to the cement plant by a half mile of belt conveyor, covered over and in tunnel to protect it from the weather.



Left, above: One of three consecutive conveyors

Above: Two views of long covered conveyor at the plant of Coplay Cement Manufacturing Co., Coplay, Penn. Note tunnel construction in interior view

Right: Large Diesel powered trucks with side-dump bodies unloading rock into a primary crusher in the quarry. Truck bodies are dumped by an Easton pneumatic lift into a No. 10 McCully gyratory crusher



## PROGRESS AT PERMANENTE

**W**ORK IS NOW nearing completion on the new wet process cement plant being built by The Permanente Corp., Permanente, Calif., near San Jose. The accompanying illustrations on this page show pictures of several important plant structures. It was planned to start the manufacture of cement early in January.

Unusually large storage capacity, 850,000 bbl., of finished cement and clinker, is provided to take care of peak demands for cement to be used in constructing Shasta dam. After this contract is completed, the large storage available in 27 concrete silos will enable the plant to furnish practically any type of cement in quantity.

Another distinctive feature of this plant is the use of long conveyors over varying grades from the quarry to the open pit rock storage areas. About 70 percent of all the stone will be stored as cement rock, the available capacity amounting to 600,000 tons.

For further reduction, a tunnel belt conveyor will reclaim limestone to a gyratory crusher and the product is stocked in another surge pile from which it is drawn for the raw mill.

Everything possible has been done to eliminate dust from the stacks and in the plant. One of the illustrations shows the dust collector building in which is located the latest type Cottrell precipitator. For details regarding this important installation, the reader is referred to *Rock Products*, pp. 24-27, October, 1939.

In the finish mill room a bag-type filter will function with each side of the mill and another will collect dust from the clinker storage bins, kiln discharges, skipulators, clinker crushers, mill bins, etc.

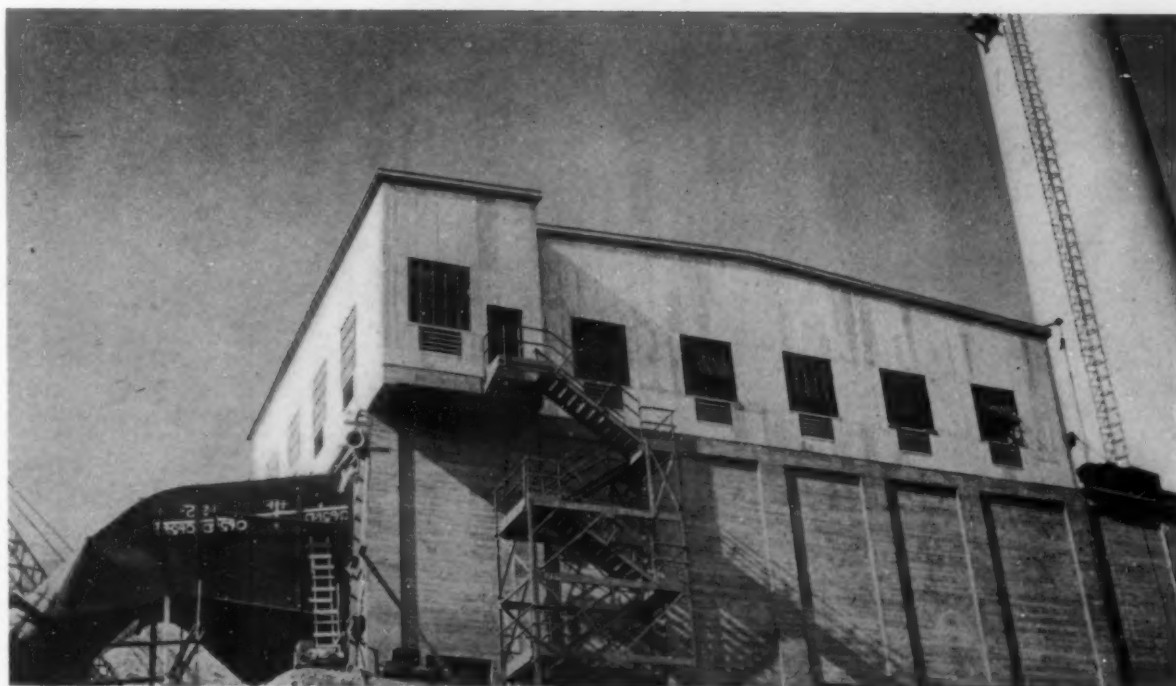


Above: Group of 27 concrete storage silos for finished cement provides ample flexibility in storing various kinds of cement which may be called for



Left: A series of three 36-in. conveyor flights totaling about 6200 ft. transport stone to the first point of screening

Below: Putting the finishing touches on the dust collector building. Both kilns exhaust through a 320,000 c.f.m. Western Precipitation Corp. Cottrell electric precipitator



# Recent Developments



Left: Installation of Western Precipitation Corp. 20-tube Multicone dust collector on a dryer in plant of Silica Co. of California, Ltd., Brentwood, Calif. Small units such as this have a wide field in those rock products operations where it is necessary or desirable to keep down dust, or to recover a valuable product now wasted



Above: Dust collectors are placed where you need them; and portland cement manufacturers are constantly finding new places for them. The view shows a Parsons bag-type collector in the clinker storage of the Bay Bridge plant of the Medusa Portland Cement Co. It recovers dust from the preliminary finish grinding mills and the elevator serving them, on the other side of the wall, and relieves the air pressure that would otherwise be built up in them

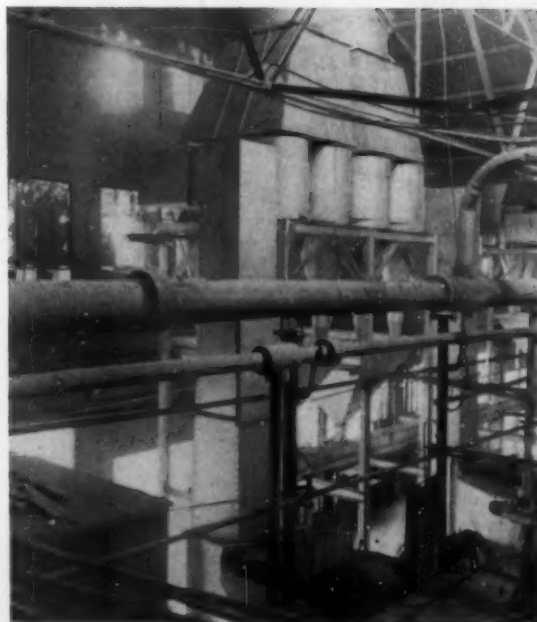


Left: In modernizing cement plants advantage has been taken of the efficiency and space-saving factors available in the gear motor. The illustration shows a 5-hp., 30 r.p.m., 440 volts, 60 cycles, G.-E. gear motor of squirrel cage induction design driving a screw conveyor of a dust collector in the finish mill of a cement plant in the Middle West. It will be noticed that this type K motor, in addition to driving the screw conveyor direct, also drives the valves feeding the conveyor through a shaft and chain drive

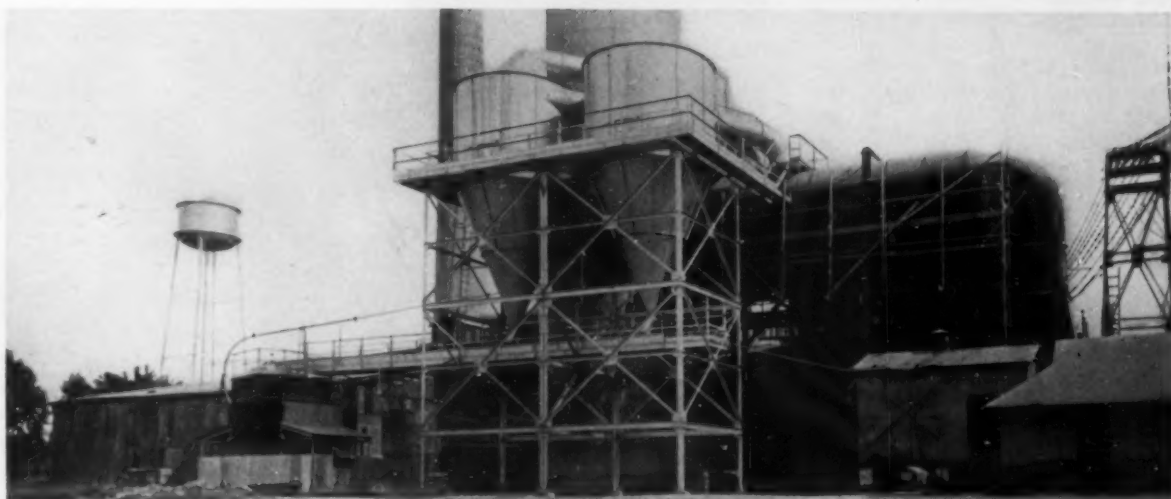
# In Dust Collection

**T**ALL STACKS are no longer the necessary distinguishing mark of a portland cement plant. These views of Medusa Portland Cement Co. plant at Wampum, Penn., show stubby stacks, in pairs, made possible by the installation of the stack dust collectors shown. The collectors are of a mechanical type known as the Van Tongeren system, made in the United States by the Buell Engineering Co. Extensively used abroad, this was the first American installation. Several others have followed in various cement plants in this country.

Left: Two nests of Buell dust collectors to trap flue dust. Below: Showing stubby stacks in pairs



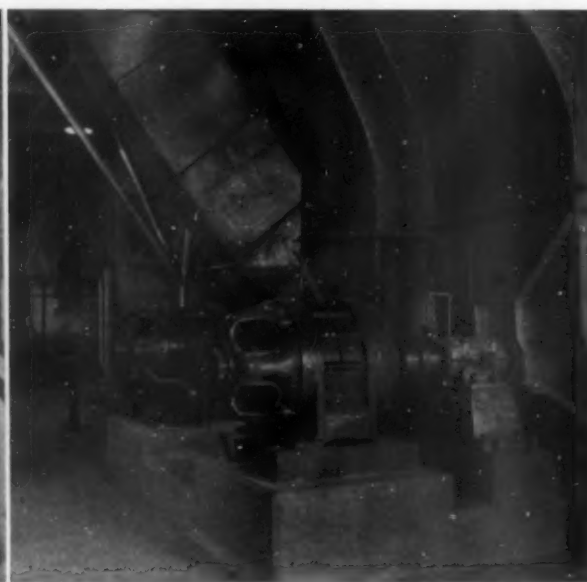
Below: Two Norbilo cyclone stack dust collectors at Louisville Cement Co's. plant at Speed, Ind. These flue dust cyclones operate under positive pressure, receiving dust-laden gases from the discharge side of the economizer fan (waste heat plant). For the other stack-economizer system in the plant, three similar units are operated under negative pressure, because of plant limitations, being connected between the waste heat boiler and the heat economizer. These cyclones are insulated with magnesite block to reduce radiation losses. Temperature loss to the economizer is about 50 deg. F. through the collectors in this circuit but is probably compensated for in part by reduced wear on the economizer fan blades. About 75 percent of the total solids in the gas stream is recovered with the cyclones. These units represent the first of their type and manufacture in the portland cement industry applied to stack collection



## NEW DUST COLLECTORS AT PETOSKEY



Left: Heads and bodies of 16 Sirocco Type D centrifugal dust collectors at modernized plant of Petoskey Portland Cement Co., Petoskey, Mich.



Right: Four Induced draft fans (multi-blade type). Fans are located on the outlet side of the dust collectors. There are four collectors per fan

**S**TACK DUST collectors were placed in operation during 1939 at Petoskey Portland Cement Co., Petoskey, Mich. The collectors for each of the four 10- x 150-ft. kilns are type D Sirocco collectors, each unit consisting of four cyclone collectors and one Sirocco induced draft fan furnished by the American Blower Corp. Gases and dust enter near the tops of the collector units shown to the left in the illustration above, and swirl downward through alternating conical and cylindrical sections, dust being removed at the bottom and air moving up as a vortex to discharge near the top.

To the right are shown the four multi-blade type induced draft fans located on the outlet side of the Sirocco centrifugal dust collectors. There is one draft fan per boiler and four collectors per fan, 16 in all. Link-Belt conveying and elevating equipment is used to reclaim the dust, which is fed back into the kiln by Minogue feeders manufactured by Manitowoc Engineering Works.

### Gypsum Specialty

**A** GYPSUM SPECIALTY product that has many applications in drying solids, liquids and gases is "Drierite." It's a form of pure anhydrous calcium silicate manufactured by W. A. Hammond Drierite Co., Yellow Springs, Ohio, that at first was sold mainly for

laboratory use. Industrial uses for it have expanded and now include drying in refrigeration, drying of cable splices in telegraph and telephone industries, the de-hydration of serums from the frozen state, the protection of large machine bearings and electrical equipment from mildew and corrosion, to prevent the formation of gas hydrates in natural gas lines, etc. It is unusual for any rock products to be sold in small bottles like this one, but a pound of the graded material is capable of drying

140 cu. ft. of air with 50 percent relative humidity. Ordinarily a 4-, 6-, 8-mesh grading or blends are specified, the larger grades, for example, sometimes 2-mesh or even more being used for drying large storage rooms, 4- to 8-mesh for drying organic liquids and 8-mesh for gases under pressure. "Drierite" is chemically active only to water and is effective in quickly reacting to it by hydration and capillary action. When saturated, the product is regenerated by the application of heat.



Plant of the U. S. Gypsum Co., at Nephi, Utah which was recently taken over

## Florida's New Gypsum Plant

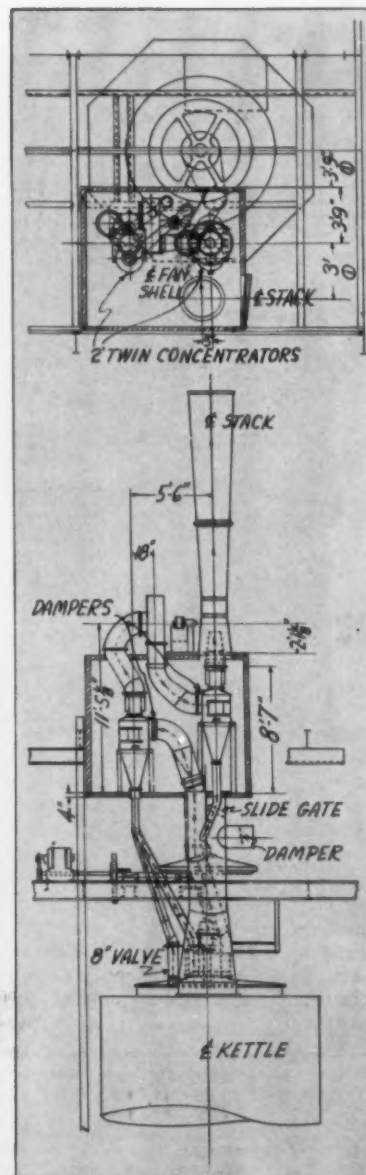
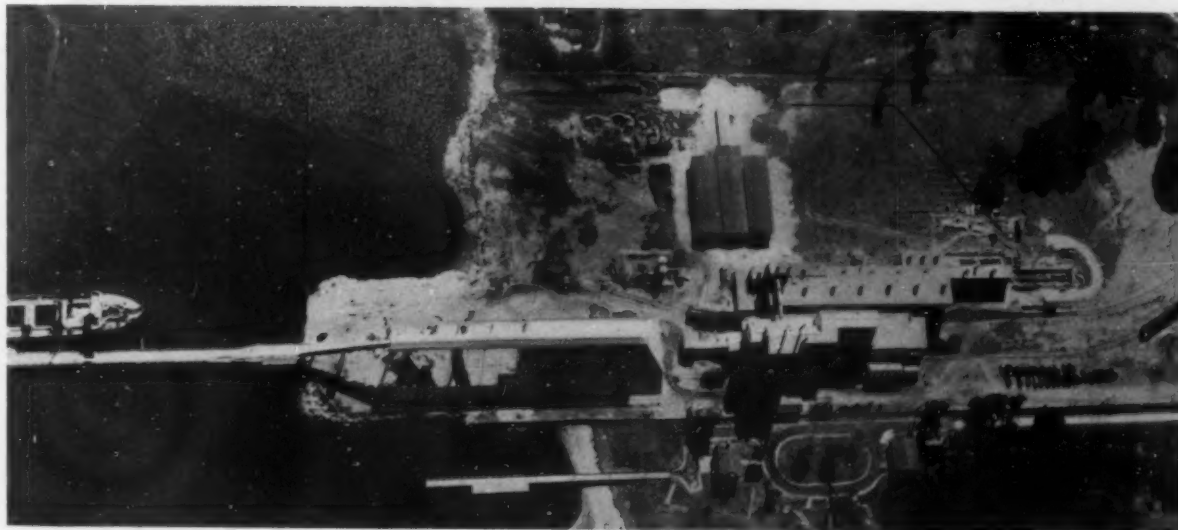
**C**APACITY of the gypsum industry has been increased considerably by construction of the United States Gypsum Co.'s new plant at Jacksonville, Fla., shown here and the new one of National Gypsum Co. at Savannah, Ga., shown elsewhere. Ocean-going steamers bring in gypsum rock from the U. S. G.'s quarries in Nova Scotia and are unloaded at the wharf and transported by conveyor into storage. Other manufacturing units shown are the plaster mill next

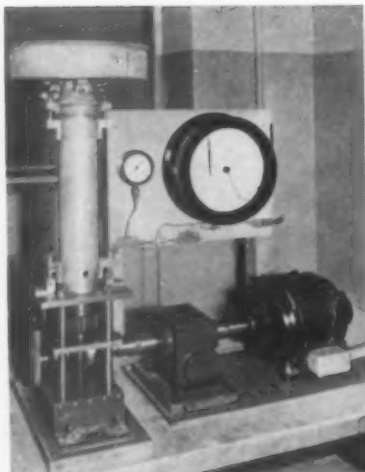
to the long building which is the board plant, and covered storage for gypsum tile.

Condensation inside dust collectors has always been a problem to contend with. The line drawing on the right illustrates how a modern dust collecting system in a gypsum plant is insulated to prevent the formation of moisture within the concentrators. This particular installation is on the exhaust of a calcining kettle, dust returning into the kettle.

Top and bottom: Two views of United States Gypsum Co.'s new plant at Jacksonville, Fla. The plant is located to receive gypsum rock by water

Right: Elevation drawing of insulated dust collecting system used on the calcining kettles at another plant to prevent moisture condensation



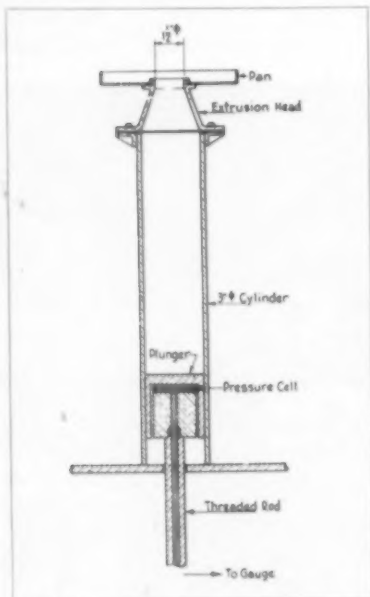


Above: Motor-driven extrusion energy machine

HERE is an extrusion machine designed and used by Prof. Walter C. Voss at the building materials laboratory of the Massachusetts Institute of Technology. Prof. Voss is studying lime mortars for the National Lime Association. He believes this machine is the answer to the researcher's prayer for a device that will measure workability of mortars and concretes.

With the aid of Prof. Voss' investigation and research the lime industry continues to make gains in the masonry mortar field. If some one could do as much for lime plaster, lime would have regained its once dominant place in the building industry.

Below: Cross-section through extrusion machine used to insure workability of mortars



## EFFICIENT SHAFT LIME KILN

ISOMETRIC SKETCH of what are claimed to be the world's most economically operated shaft lime kilns. This plant (with two instead of three kilns) was put in operation at Beachville, Ont., in May, 1939, by the Gypsum, Lime and Alabastine, Canada, Ltd. Victor J. Azbe was designing and consulting engineer. They produce 75 to 80 tons per kiln, using natural gas fuel, with a higher labor efficiency than a rotary kiln, it is said.

The original specifications were rather rigid. The plant was not to cost more than \$500 per ton of daily capacity. Fuel consumption was not to be more than 5000 cu. ft. of natural gas per ton of lime. Labor was to be less than 40c per ton for charging of kilns, firing, drawing, trimming, picking and loading of lime. It is reported that every one of these requirements was bettered.

Only one man is required to charge the kilns, taking the place of three men usually employed for this purpose; one at the hoist, one on the kiln top and one to couple the cars. The single operator fills the 4-ton car from the bin, steps over to the hoist, starts the car on its way up the incline. When the car reaches the respective kiln into which it is to dump,

the kiln doors open, and at the very precise moment, the car gates also open and the stone slides into the storage section of the kiln.

The kilns are of the submerged gas offtake type, that is, the upper part of the kiln is storage zone, merely holding the rock ready to follow into the active part of the kiln after the lime is drawn. This arrangement has several advantages. The active kiln portion remains full all of the time, the kiln can be charged at any convenient time, fan temperatures are equalized, draft is more constant and all of the stone obtains about the same kiln time. As these kilns are drawn every two hours, stone is automatically received every two hours and the waste gas temperature at the fan fluctuates in a regular cycle from only about 300 deg. F. to about 600 deg. F. at the highest.

As the year 1939 closes it looks as if a plant of similar design, using producer gas fuel, would soon be built in the United States. The Canadian plant is designed to substitute producer gas should natural gas become too high priced.

Sketch showing original design of shaft kilns for Gypsum, Lime and Alabastine, Canada, Ltd., Beachville, Ont.

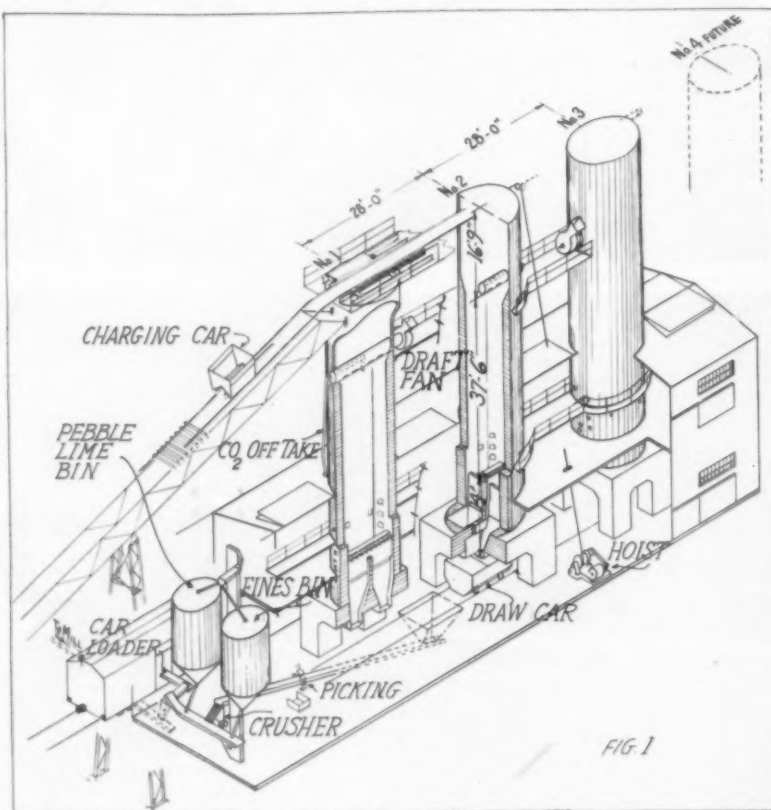


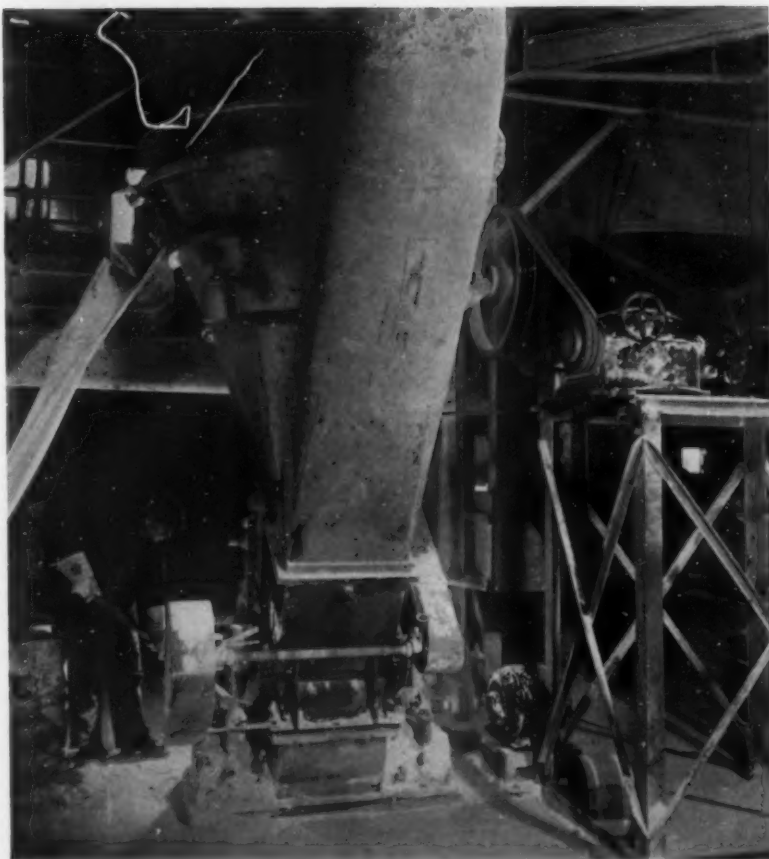
FIG. 1

## FINELY GROUND LIME PRODUCTS

**W**ITH THE INCREASE in the number of fine lime products, the use of air separators designed to provide for variations in size are becoming more general. The production of fines is largely controlled by speed changer units on the separator drive. In the illustration is shown an Allis-Chalmers vari-pitch speed changer unit driving a Raymond Whizzer separator in a Middle West lime plant. It is a  $7\frac{1}{2}$  hp. unit driven through a Texrope belt by a 1200 r.p.m. motor, giving a speed range on the output shaft of the speed changer of 665 r.p.m. to 2160 r.p.m. The separator speed range is from 200 to 648 r.p.m.

ASKED WHAT HE THOUGHT about some of the new lime products being marketed for mortars, a leading lime manufacturer said: "I am against them; all we need is pulverized lime. The trouble with selling lime for mortar has been that the idea has grown up that lime has to be doctored in some way before it can be used, has to be aged, or have some added ingredient. We have found that finely pulverized lime can be hydrated on the job in an ordinary mortar box to give a highly plastic putty. That's what lime manufacturers ought to be selling—lime, just lime."

Certain it is that the purchaser of pulverized lime gets about the most lime for his money. It keeps well and as now packed in multi-wall water-proofed bags there is little danger in handling it. Maybe pulverizing the lime keeps down the temperature of hydration (see the Lime Forum article in this issue). Latest X-ray studies of lime would make it appear



Above: Air separator with speed changer drive unit facilitates production of fine lime products

that the temperature of hydration has a much greater effect on the character of the hydrate than the temperature of burning in making the lime.

Below: Bulk cement containers used by Basalt Rock Co. Note hoist and special clamp device

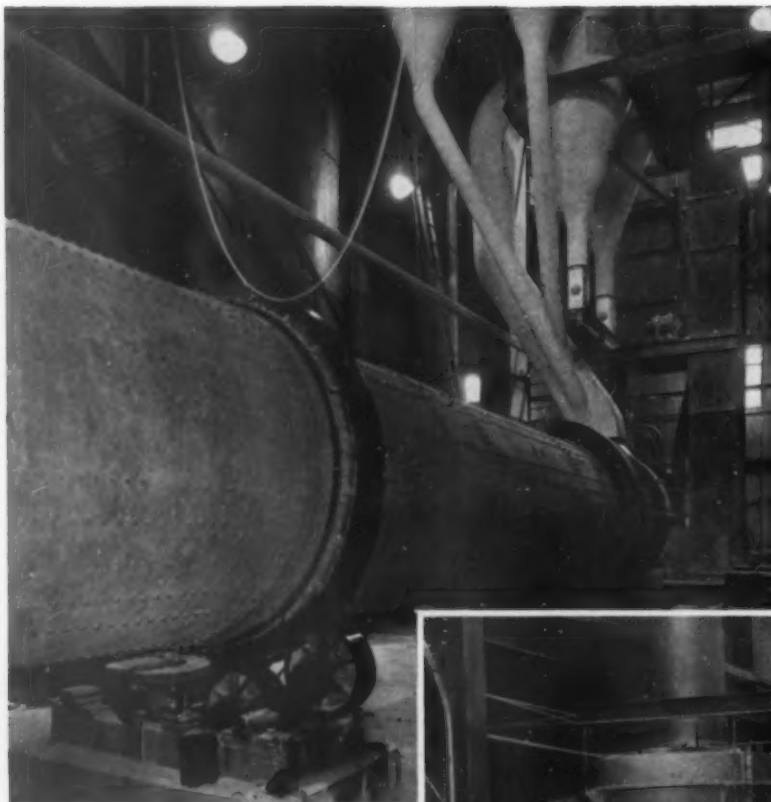


## Bulk Cement

**B**ULK CEMENT was preferred to sacked cement by the Basalt Rock Co., Napa, Calif., in operating its small ready-mixed concrete plant at Flosden, near Vallejo, Calif., so the special bulk cement containers shown in the illustration were developed for truck delivery. The containers hold about 5 tons of cement and are of 14-gauge steel. They are filled at cement mills located within a radius of 100 miles and delivered to the plant, two or four at a time, on trucks.

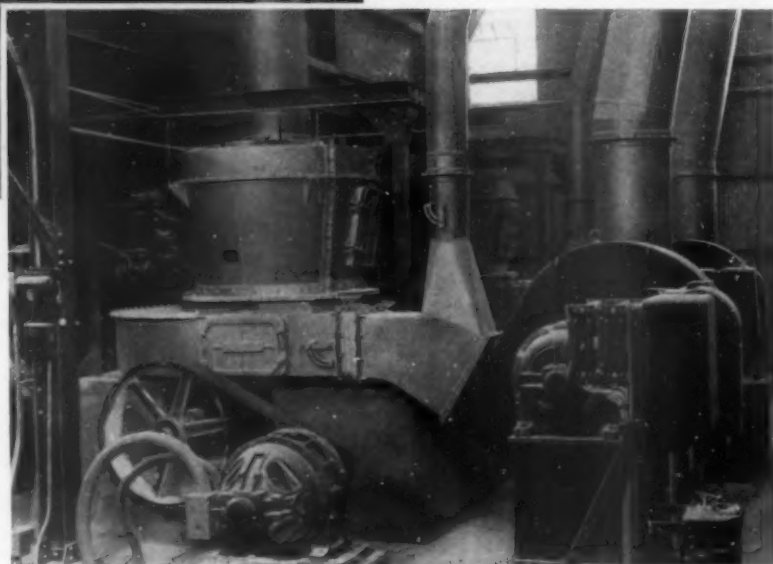
At the plant, a special hopper feeding to a screw conveyor and then an enclosed bucket elevator was developed, with the cooperation of Link-Belt Co. engineers, to empty the containers and fill the bin. An overhead chain hoist clamping device engages conveniently spaced hooks on the containers to raise them off the truck bed and place them over a circular hopper opening. Diametrically opposite set screws are turned to drop the container bottoms in two hinged sections at the center.

A special platform was built on which the bulk containers are placed, awaiting a pick-up by truck. This platform will accommodate more than 10 bulk containers.



Above: Insulated dust collectors to draw off dust from the drier

Right: Roll mills which pulverize dried gypsum rock to 100-mesh



**S**OME HIGHLIGHTS of National Gypsum Company's new gypsum board and plaster plant at Savannah, Ga., are illustrated here in pictures. It is an outstanding development of 1939 in the gypsum industry, and has a capacity of 250,000 sq. ft. of gypsum board and 350 tons of plaster in 24 hours.

One of the illustrations shows how gypsum rock of several grades in storage is reclaimed. The rock is shipped to the plant in ocean-going steamers from the company's quarries in Nova Scotia. The unloading and stockpiling arrangement, designed by the company, consists of a Robins traveling, electric driven unloading tower on the dock, three 30-in. conveyor belts in succession and a stacker, with 100 ft. of belt conveyor on the boom, that places rock in storage at the rate of 400 tons per hour. In the picture a Northwest crane is reclaiming rock to the

Right: Reclaiming stored gypsum rock to a stacker filling the bins



## Inspecting

stacker, which discharges into bins. It is a very mobile handling unit and has a turning radius of 267 deg.

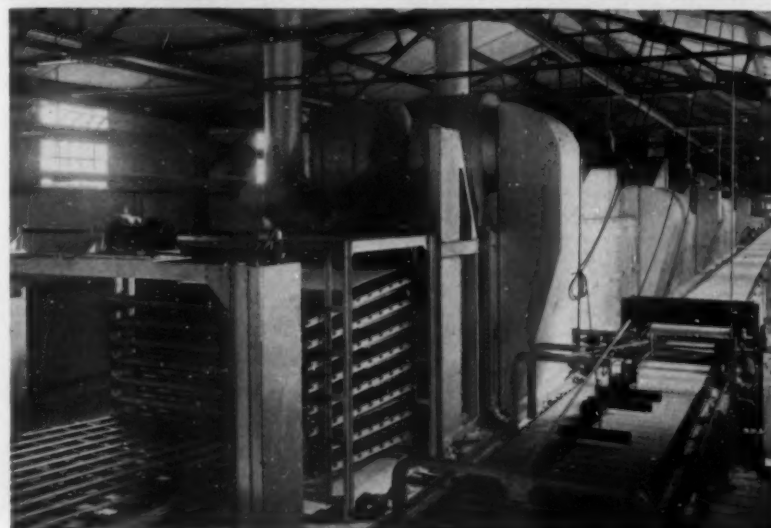
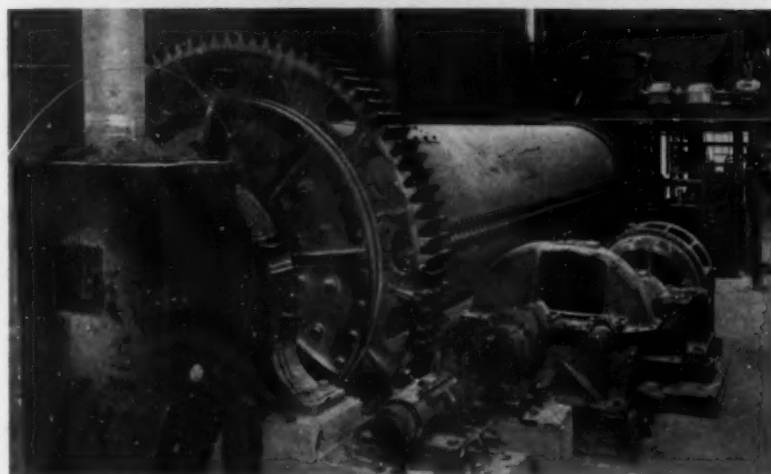
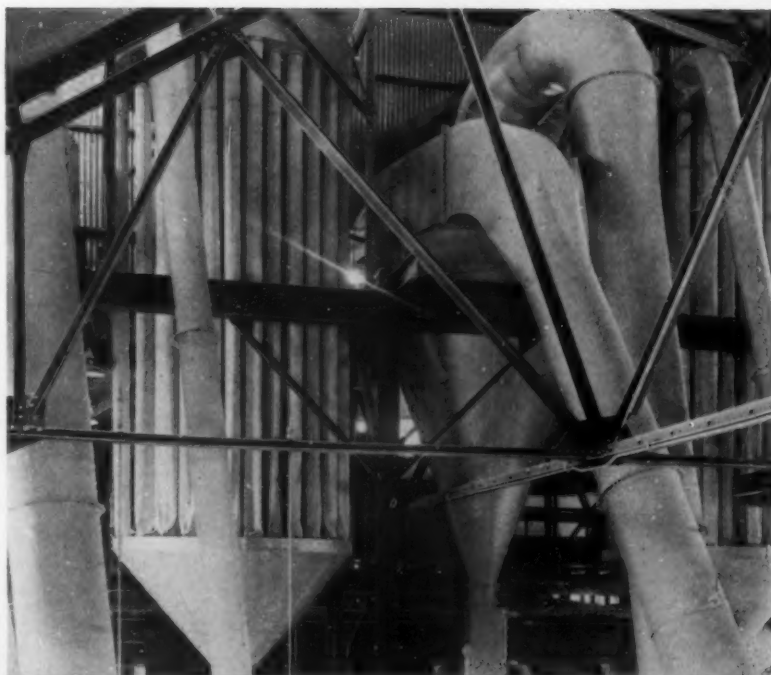
Another view shows a 6- x 40-ft., oil-fired, indirect-heat Hardinge Rugles-Cole drier through which gypsum rock is passed preliminary to further reduction. Cement rock is

# National's New Gypsum Plant

screened out for direct loading to cars just ahead of this operation. In the background may be seen insulated Raymond dust collectors to draw off dust from the drier. The collectors are of special concentrator type, dust precipitating into four units. Temperatures are maintained at about 200 deg. F. within the concentrators to reduce condensation. Dried rock is reduced to about 40 percent through 100-mesh by means of a Williams hammer mill and is then put through a 12-ft. Sturtevant mechanical separator to skim off an 85 percent minus 100-mesh product. Dust from the drier dust recovery system also enters the separator. Rejects from the separator are the feed to two Raymond 5-roll, low side mills shown in another illustration, which each grind 10 tons per hour to 85 percent minus 100-mesh. The mills are equipped with 8-ft. cyclone collectors and tubular dust collectors which are filters with a number of cloth stockings or tubes to remove dry dust from the mill and cyclone collector vents. These are shown in another view. Calcination is done in two Ehram kettles at 300 to 350 deg. F., which are equipped with Raymond special type dust collectors of an entirely new design.

The plasticized gypsum is produced through the use of tube mills, one of which, a 5 x 22-ft. Allis-Chalmers tube mill, is illustrated herewith. The feed to the mills is varied to control plasticity. In another view the feed end of the gypsum board drier furnished by the Coe Manufacturing Company is shown, and a part of the wallboard conveyor can be seen to the right. The drier is 230 ft. long, has 8 decks and is thermostatically controlled.

To the right: Top, dust collectors to remove dust in pulverizing to 100-mesh in roll mills; center, plaster is given added plasticity by passage through a tube mill, variations in feed governing plasticity; below, feed end of gypsum board drier, showing cut-off blade, etc.



## LIME PUTTY INCREASING IN FAVOR



Above: Jahncke Service, Inc., has added three new ageing tanks shown in the background

**A**S EVIDENCE that lime putty is increasing in use, a number of companies have added more ageing tanks to increase plant capacity.

Three plants have made additions to capacity in 1939; the Colonial Sand & Stone Co., Inc., Astoria, Long Island, N. Y., originally a four-tank Brooks-Taylor unit increased to six units; Jahncke Service, Inc., New Orleans, La., three new units; Louisville Lime Mortar Co., Louisville, Ky., increased capacity 50 percent by adding a third tank built by Chicago Bridge & Iron Co.

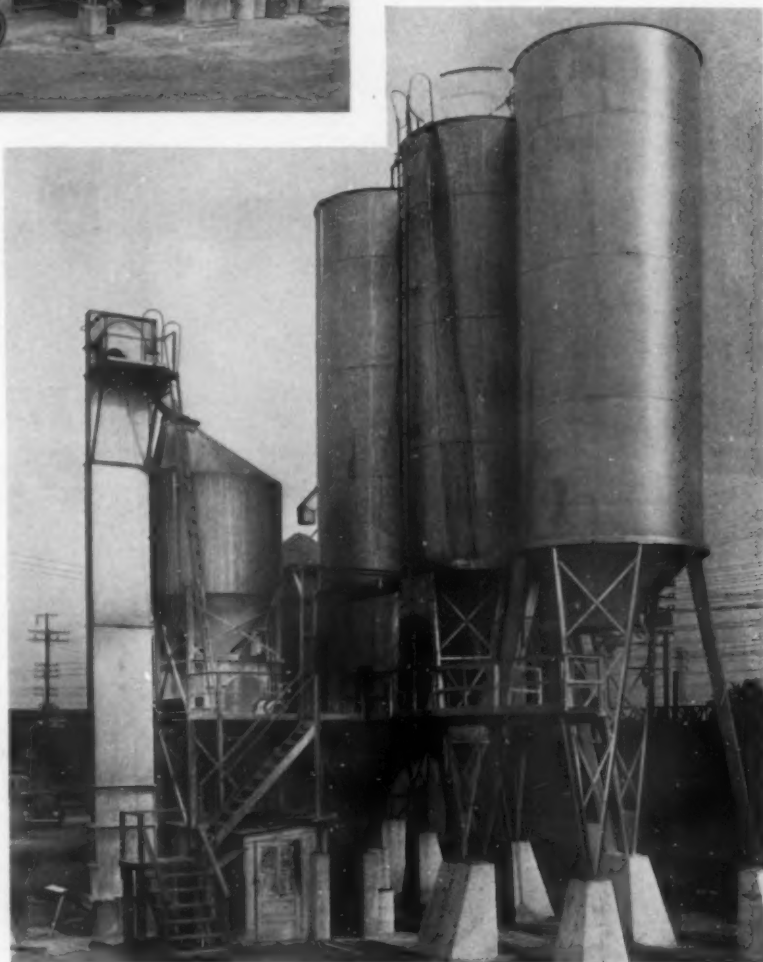
An entirely new plant is being fabricated at Birmingham, Ala. for the Massaponax Sand and Gravel Corp., Fredericksburg, Va. This plant will be erected in Richmond, Virginia.

Aged lime putty is a controlled product and one which fits admirably into the activities of producers of ready-mixed concrete who have already the delivery equipment needed to give the contractor the service he wants. In one city several producers of ready-mixed concrete

have pooled their efforts in establishing a lime mortar plant.

Like ready-mixed concrete, lime putty is a product that must be merchandised, and being comparatively new, it had to be introduced in each city where it is used on the basis of its worth as a construction material. Some of the companies which are now successfully selling lime putty called in an expert from the beginning to educate their prospective customers and their salesmen. Several of them engaged the services of Norman G. Hough, former president and general manager of the National Lime Association, and he was the intermediary between the company he represented and the architects and contractors.

Below: Putty plant of Louisville Lime Mortar Co., Louisville, Ky., as it looks after the addition of a third ageing tank



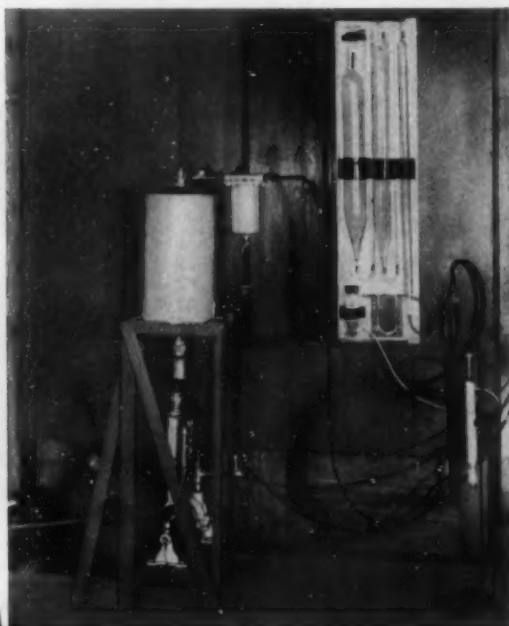
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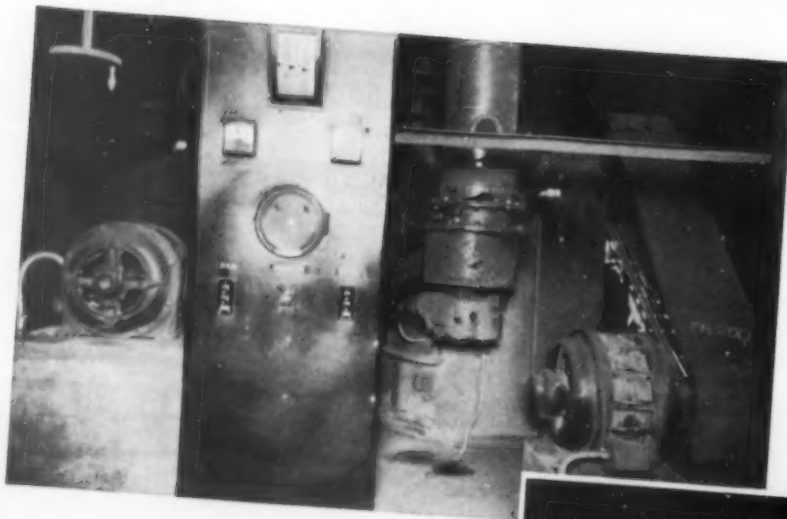
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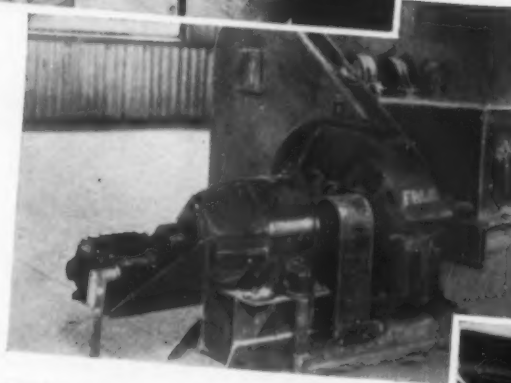


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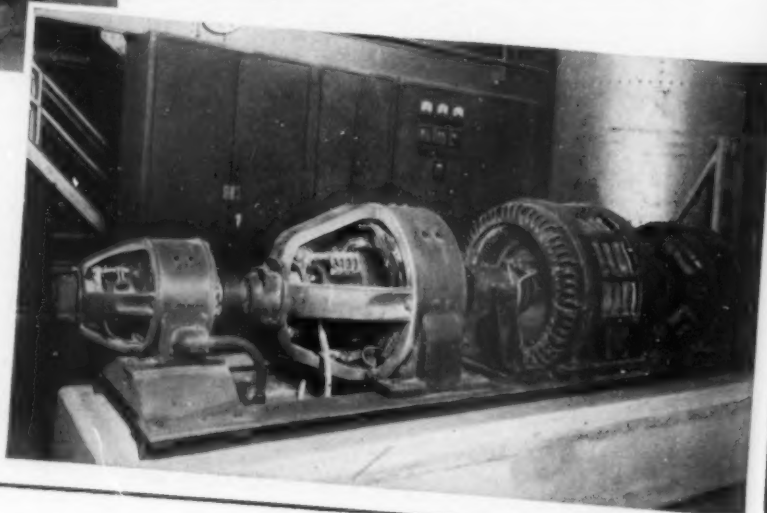


#### ADJUSTABLE-VOLTAGE DRIVE FOR CEMENT KILNS

General Electric engineers have successfully applied adjustable-generated-voltage control to cement-kiln drives. Two or more kilns can now be powered by one synchronous motor-generator set. Yet each kiln retains completely independent speed adjustment. This drive gives cement and lime kilns ideal starting conditions and smooth, flexible speed-control by merely adjusting the strength of its generator field. Each feeder drive is synchronized with its kiln drive but the ratio of feeder speed to kiln speed may be modified by a "vernier" speed ratio adjustment.

## What Kind

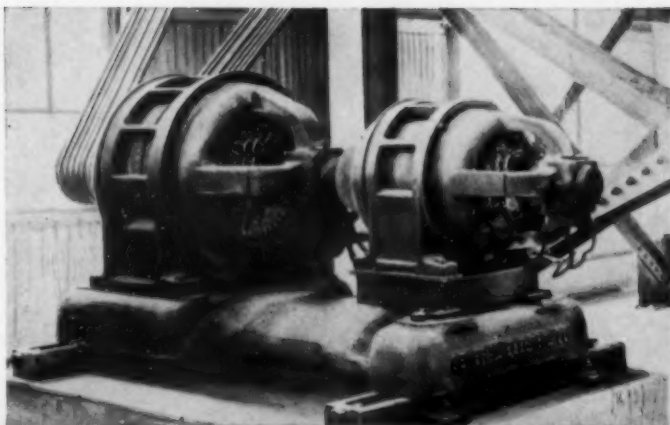
**H**ERE are examples of some of the ways General Electric engineering is aiding cement and other rock-products plants to get lower costs and a higher-quality product. Consider them in the light of your particular requirements, and take your questions to the nearest G-E representative. He will be glad to help you. General Electric, Schenectady, N. Y.



#### ROCK PRODUCTS

#### POWER SELSYNS CONTROL FEED TO KILN

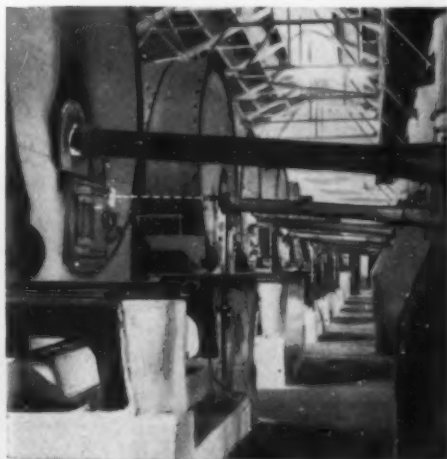
Synchronizing the rate of feed with the speed of the kiln by means of power Selsyns was first accomplished by G-E engineers. This Selsyn transmitter, driven by a G-E induction motor, maintains the feeder motor in fixed speed relation with the kiln. Users report that these sturdy, self-contained units assist in producing high uniformity of clinker, minimize mud-ring formations, and prolong the life of the kiln lining.



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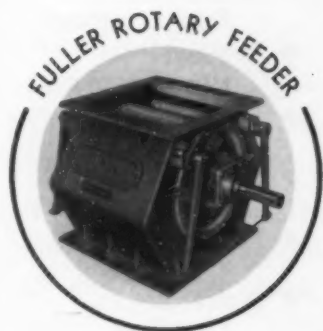
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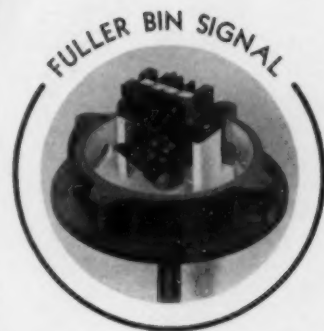
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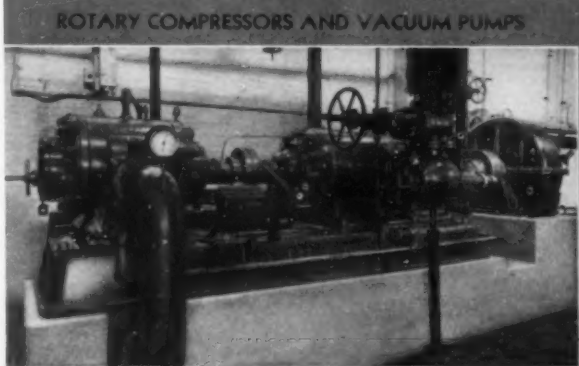
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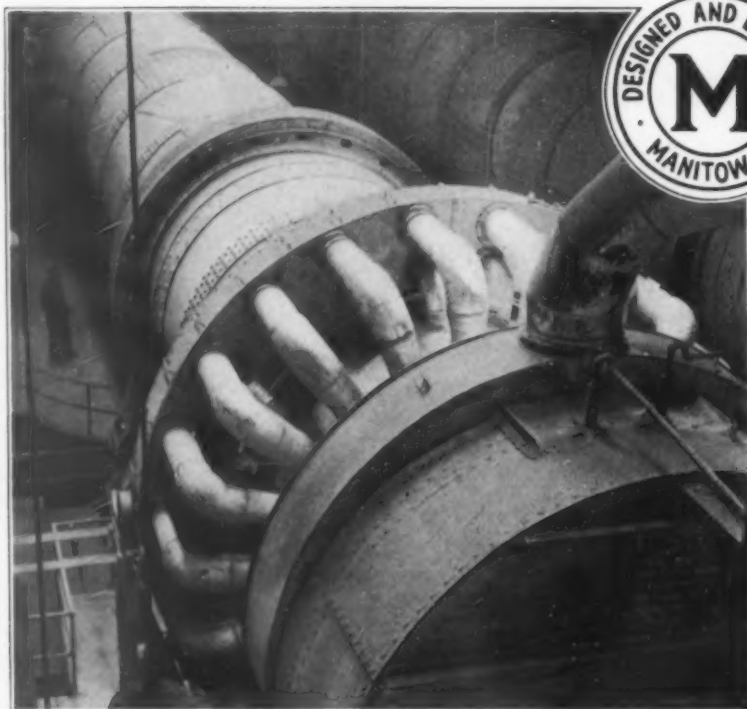
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## Cement, Lime and Gypsum

(Continued from page 35)

(ROCK PRODUCTS, October, 1939). One of the best fluxes or catalysts for fusing or maybe clinkering lime and silica should be steam. Possibly there may be sound reason for believing that one advantage of a unit coal pulverizer installation for kiln firing is that the moisture goes into the kiln with the combustion air. Somewhere there is a balance between the good done by the moisture in aiding clinkering and the harm done by it in absorbing useful heat from

the kiln. There are still a lot of skeptics as to whether the moisture does any good.

### Lime

The lime industry has evidently increased production considerably over 1938 figures; at least two large producers of rotary-kiln lime have increased capacity. A new sintered dolomite plant has been built in Ohio and a new one is projected in the Chicago district. A new lime plant is projected in Ohio. The United States Gypsum Co. is rumored to have purchased a controlling interest in the

Peerless White Lime Co., Ste. Genevieve, Mo. (company will not confirm).

The possibilities of much greater economy in the design and operation of shaft lime kilns have been fully demonstrated in the new plant of the Gypsum Lime and Alabastine, Canada, Ltd. (Rock Products, October, 1939). This has an important business implication; for the tendency of the lime industry in the last decade has been constantly toward larger and fewer manufacturers. There are less than half as many active plants as there were 10 years ago, although production is not much different. The small local plants have been squeezed out, because of low prices, high costs and demand for better product. Also, users of large quantities of lime are more and more producing their own.

There are still great possibilities in the lime industry. New industrial uses are constantly being found. Much publicity is being given to a new plastic made from sawdust waste—promises to be the cheapest of all plastics; lime is used twice in the process. American paper mills are wasting an estimated 1,500,000 tons of lignin, which is the basis of the new plastic. We don't know yet how much lime this would require, but evidently a nice market. The manufacture of synthetic rubber also requires lime or limestone. The prospective industrial applications of lime seem vast — lime manufacturers should be helping to lead the parade instead of being "innocent bystanders."

### Gypsum

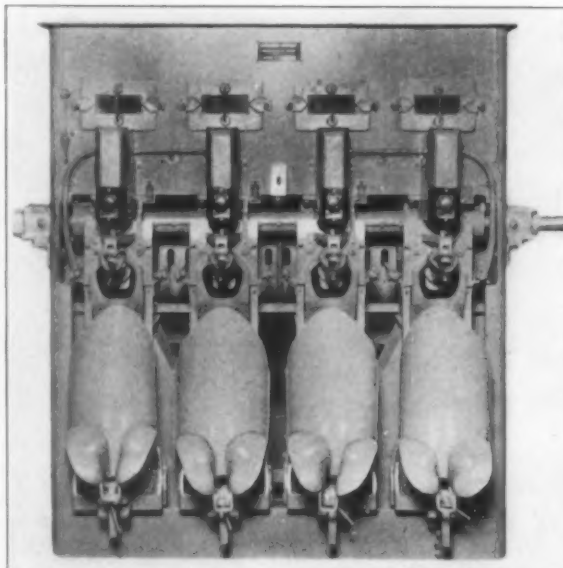
The gypsum industry seems to be gravitating largely into the hands of three large companies, with national distribution, who make many other building products. Two of these companies built new gypsum products plants in the South in 1939, one at Savannah, Ga., and the other at Jacksonville, Fla. Another new plant is to be built in the Bronx, New York City, and a new plant is projected on the West Coast.

The two new Southern plants use the time-honored kettle process for calcining, but one West Coast producer is calcining and grinding in one operation, in a heated mill with air separator. This method was first used to calcine gypsum for retarder of portland cement several years ago, but the new installation calcines gypsum for stucco—probably the first such product ever made in this equipment. The rotary calciner does not appear to have made progress for stucco gypsum.

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## Electrostatic Separation of Minerals\*

**T**HE HUFF or conductivity type of electrostatic mineral separator has been found to obey a simple mathematical relationship. In customary operation, the undeflected material from one roll is passed over another roll. Several portions of deflected material are therefore produced. Critical examination of experimental data has shown that the weights of these portions are simply related. This phenomenon is due to the fact that each particle has a probability of deflection. Actual numerical values can be obtained. In the separation of zircon from gangue the probability of deflection was found to be 0.27 for a fairly long interval during the separation.

A vibrating-table-type of conductivity separator has been described. With this machine, it was found that separations could also be obtained when alternating current was supplied to the overhead electrode instead of the customary interrupted

\*From a recent Progress Report of the U. S. Bureau of Mines (No. 7337).

direct current. Appreciable differences in the characteristics of the separation were noted when the phase angle between the alternating current supplying the actuating electro-magnet and that supplying the step-up transformer for the overhead electrode was varied.

The Huff and most other types of separators utilize the property of electrical conductivity. Some work utilized the property of contact potential for electrostatic separation. This latter work has been broadened considerably.

Previous investigations had been confined almost entirely to the use of aluminum as the surface on which the minerals are contacted. Some of the new surfaces investigated were magnesium, nickel, cupric sulfide, silver sulfide, lead dioxide, zinc sulfide, and aluminum silicofluoride. These contacting surfaces and the minerals that are electrically charged on them can be arranged in a contact potential series. It is possible to measure accurately the contact potential of the contacting surfaces.

The contact potential of the minerals cannot be measured directly but may be estimated by the position of each mineral in the contact potential series.

For the separation of minerals of large particle size, the contacting surface is in the form of a horizontal vibrating plate. Because of this vibration, mineral particles are moved along the top surface and finally over the edge of the plate. From here the particles drop into the field between two electrodes, where a separation of oppositely charged particles is effected.

With minerals of fine particle size, a different method is used: The finely divided mineral is suspended in a gas, such as air, and blown through a specially designed disperser and electrifier from which it emerges and passes into a field between two electrodes where a separation of oppositely charged particles is effected.

As with this type of separator the fine particles are deflected at a greater rate of acceleration than the coarse particles; a particle-size separation is also obtained in addition to the mineral constituent separation. The mineral constituents that have been separated included the

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The illustration at the left is of a PARSONS Unit Type Dust Arrestor with the fan and drive mounted overhead. Just set it in place and connect dust pipe into expansion chamber. You can't find anything more simple—yet as efficient.

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This new unit deserves the serious consideration of every operator interested in increasing the capacity of his grinding mills.

The principle of rejecting the coarse particles by means of an adjustable centrifugal sizing fan is an exclusive GAYCO feature.

We also manufacture Bucket Elevators — Bin Gates — Belt Conveyors — Feeders — Grizzlies — Rock Crushers — Revolving Screens and furnish complete crushing, screening and washing plants for crushed stone or sand and gravel.

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## ROCK PRODUCTS

*Will Report  
the Conventions  
and Expositions  
of the*

NATIONAL SAND and GRAVEL  
ASSOCIATION

NATIONAL READY MIXED  
CONCRETE ASSOCIATION

NATIONAL CRUSHED STONE  
ASSOCIATION

*For You in the*  
**February Issue**

Our entire staff of engineer-editors will be on the job for the duration of these great shows and will present, in concise intelligible form, reports and summaries of the meetings and discussions as well as other activities. Understood, digested and rearranged under proper headings, these reports are of great value as a genuine source of information.

*Watch for the  
February Issue of*

## ROCK PRODUCTS

following combinations: Muscovite, biotite, lepidolite-quartz, fluorite-sphalerite, rhodochrosite-quartz, and barite-quartz.

The convenient feature of this fine-powder separator is the fact that it is not affected by a high humidity of the surrounding atmosphere. The gas in which the particles are suspended, however, must be free of moisture.

Pulverized alberene stone, representative of immense quantities of waste produced in the quarrying and milling operations incident to the manufacture of the well-known alberene products such as sinks, table tops, panel boards, and other things, has been subjected to electrostatic separation treatment at College Park in an attempt to obtain more readily saleable by-products.

By contacting on an aluminum electrifier and subsequently passing through an electrostatic field, the dolomite portion was separated from the talc and chlorite, but the tremolite and magnetite were divided between the two fractions. The purpose of this separation is to produce a purer grade of the talc fraction, and this possibility apparently has been realized.

### New Cement Plant in India

PATIALA CEMENT CO., LTD., subsidiary of the Associated Cement Cos., Ltd., India, has a modern cement mill in the recently completed Bhupendra Cement Works at Surajpur, near Kalka, Patiala State. The mill features a 10- x 370-ft. rotary kiln, a seven mile aerial cableway from the quarry to the plant, and has a rated capacity of 100,000 tons of cement annually. It was built to accommodate future expansion and has a modern village for employees, complete with hospital, recreation grounds, etc. The Maharaja of Patiala officially opened the plant on June 14, 1939.

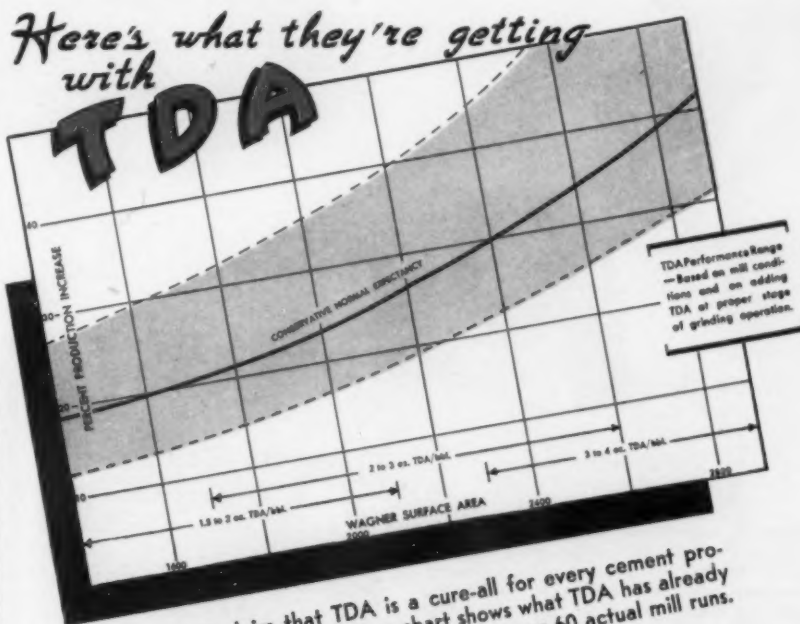
### Annual Report on Road Construction

BUREAU OF PUBLIC ROADS, U. S. Department of Agriculture, now called the Public Roads Administration of the Federal Works Agency, reports that 17,000 miles of highway were improved under its program during the past fiscal year. Outstanding features of the program were the large amount of widening and straightening of important main highways, progress made in eliminating hazards at railroad grade crossings, and the completion of nearly 3000 miles of secondary roads. The major part of the work was done in co-

operation with state highway departments, 13,482 miles being completed in this program. During the year, the Bureau completed the first comprehensive study ever made of the national highway situation, taking into account conditions on city streets, main rural highways and on farm-to-market roads. The study revealed that express routes passing directly through the centers of the largest cities are urgently needed to relieve serious traffic congestion.

### Cement Companies of India Use Educational Buses

THE ASSOCIATED CEMENT COMPANIES, LTD., of India operate a fleet of buses. Instructional leaflets on the uses of cement are distributed throughout the country by means of these buses, and demonstrations are given by trained men in the towns and even in the homes of the farmers. Perhaps this plan may offer a suggestion for companies in the United States.



We don't claim that TDA is a cure-all for every cement production problem, but the above chart shows what TDA has already done in increasing finish mill production in over 60 actual mill runs. Here are examples from three different plants:

CASE NO. 1: A plant operator grinding H.E.S. cement in open circuit increased his production 53%. He reports that, in addition, he got higher strength, greater workability, and fewer headaches.

CASE NO. 2: Another user of TDA, grinding H.E.S. cement in a closed circuit with an air separator, obtained a 28% increase in production. The efficiency of his separator was improved as well.

CASE NO. 3: A producer grinding in the low-surface-area range finds that TDA is giving him a 30% increase in production in open-circuit operation.

Maybe TDA won't do all this for you, but isn't it worth a trial? Look at the chart again. At the fineness you're grinding you can select for yourself the average production increase you can expect with TDA in your mills. Doesn't this again justify a trial? Our engineers will be glad to cooperate in every way in discussing your particular problem. Write Dewey & Almy Chemical Company, 80 Whittemore Ave., Cambridge, Mass.

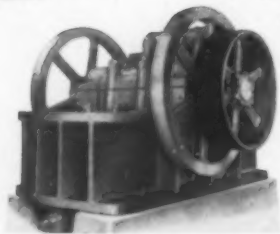


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**What is TDA**  
TDA is a mixture of triethanolamine salts and highly purified soluble calcium salts of modified lignic sulfonic acid. TDA is an excellent grinding aid. Its presence improves many of the important properties of concrete such as durability, strength and permeability.

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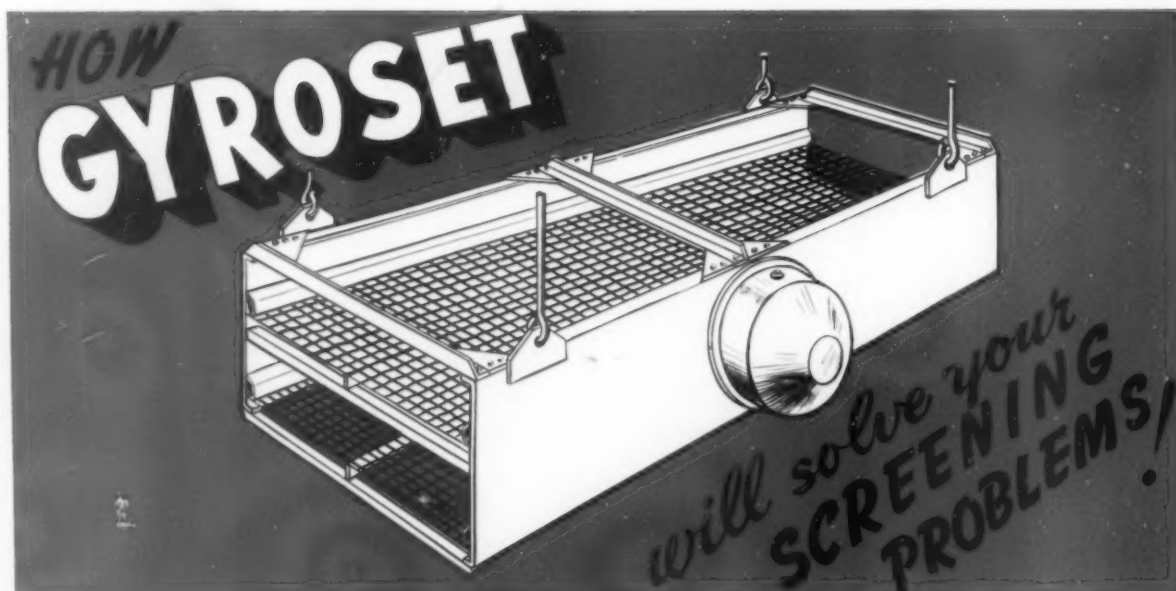


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*Aggregates*

**SAND AND GRAVEL  
CRUSHED STONE  
SLAG *and*  
INDUSTRIAL SAND**




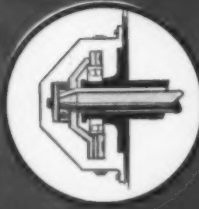

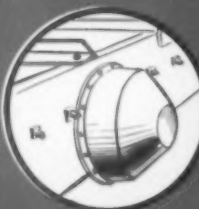

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or dry. You can adjust the machine to exactly fit the product in hand and do it easily and quickly without special tools. Available in one, two or three decks; open, semi-enclosed or fully enclosed models.

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 <p><b>SAFETY</b> —built-in—all moving parts of vibrator assembly are fully enclosed—no exposed flywheels to catch the hands or clothing of operator.</p>	 <p><b>SCREEN CLOTHS</b> —can be easily and quickly changed—avoiding costly shut-downs.</p>	<p><b>The GYROSET has POSITIVE "ECCENTRIC ACTION"</b> (Not Offset weight!)</p> <p>Action imparted through the use of simple compound eccentric balance wheels so is not affected by load or rate of feed.</p>

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SCREENS

# Tough Requirements and too Many Specifications for Aggregates

By BROR NORDBERG

SOME OF THE LATEST DEVELOPMENTS in the aggregates industries are shown by the photographs and drawings which follow. They were selected to illustrate producer ideas and plant developments which must be made just as long as users of aggregates continue to grow more exacting in their specifications and in their demands for quality.

Natural sand production has been materially affected. There continues a demand for more 50-mesh and even for definite amounts of 100-mesh particles within close tolerances in concrete sand to be used in some classes of construction. Production of these sands means more controlled classification, provided the raw material deposit contains enough fines. Inter-blending fine sand from another source is one way to make up a deficiency in fines. The other recourse under consideration is to manufacture sand from pea gravel or "shot."

## Grinding Up Sand

Columbia Construction Co., Inc., Redding, Calif., is planning to grind up sand by feeding  $\frac{1}{4}$ - to  $\frac{3}{8}$ -in. gravel through a rod mill. This is necessary to fill its contract for 2,800,000 tons of sand to be used in the construction of Shasta dam. Sand will be manufactured at the rate of 100 tons per hour to replenish natural sand lost in putting it through a slug mill to break down a disintegrated rock coating on the particles.

In a commercial sand and gravel plant at Columbus, Ohio, American Aggregates Corp. is making and stocking five sizes of sand. It seems incredible that sand production should take this turn, but the plant was so designed because federal and state specifications are demanding more and more that sand be split on one mesh or another. A  $\frac{3}{16}$ - to  $\frac{1}{8}$ -in. sand and one  $\frac{1}{8}$ - to  $\frac{1}{10}$ -in. are taken direct from a double-deck vibrating screen and placed in separate storage compartments over a reclaiming tunnel belt conveyor. The screen throughs enter a sand drag which discharges a  $\frac{1}{10}$ -in. to 50-mesh sand with the overflow entering a long settling tank where 50-mesh sand is

divided into two sizes. Desired fractions of each sand are reclaimed on the belt. It's an unusual plant but it isn't likely to be stumped easily in producing sand to any reasonable specification (Rock Products, Aug., 1939, pp. 25-27).

## Producing Asphalt Sand

Another "out" for the ordinary sand plant was one built in the East in 1939 to produce asphalt sand to very close specifications. It applies the methods of splitting and recombination used so successfully in producing huge tonnages of sand, for the construction of Boulder dam and Grand Coulee dam, to a commercial plant with a modest capacity of 50 tons per hour. The specification states that 32 percent be between 8- and 40-mesh, 42 percent 40- to 80-mesh and 26 percent between 80- and 200-mesh. In anticipation of future changes to asphalt sand specifications and possible new sand products to be developed the plant was designed to split the sand at 8-, 20-, 40- and 80-mesh. Original feed of minus 8-mesh sand is thickened in dewatering cones and fed into an 8-compartment sizer which employs the hindered settling principle of classification to separate the sand into definite fractions. Discharges from the various sizer compartments are dewatered in four rake classifiers, with the overflow from the last sizer compartment classified in a bowl classifier. The rising currents of water in the sizer can be varied, different groupings of sized material can be fed to the various rake classifiers and the four sand products can be interblended to provide flexibility.

## Stone Sand

Stone sand continues to interest crushed stone producers who seek to develop new markets. It's significant that the Commonwealth of Pennsylvania, Department of Highways, used 13,000 tons of limestone sand as the fine aggregate in construction of a concrete highway in 1939. The State had previously used stone sand only experimentally.

Sand was produced for this contract at the Annandale, Penn., plant

of Pittsburgh Limestone Corp., a U. S. Steel subsidiary. The specification was rigid, requiring a high percentage of 50-mesh particles and 3 to 6 percent, a very close tolerance, of minus 100-mesh sand.

Screenings are the source material, without special crushing, and are a product principally of blasting in the mine. The process is wet and consists of separation of the particles into definite size groups and accurate re-combination of several fractions. After separation, first by a rake classifier and then by vibrating screens, part of the sand is put into a special hopper and the rest into a bowl-rake classifier. At the hopper, definite amounts of sand are fed out to a belt conveyor to join the classifier product coming off the drainboard just over the sand bin.

The final product is a uniform sharp sand that was very acceptable to the contractor. In placing the concrete for the highway there was said to be no evidence of harshness or bleeding, using an 8-bag mix with 37 to 40 gal. of water.

## Soft Stone

Engineers continue to study the effect of soft particles in aggregates on the service behavior of concrete. We know that some deposits have been condemned and we also know that commercial soft stone eliminators, log washers, jigs and revolving drum impact machines have satisfactorily removed soft materials in some plants. Certain states have been more insistent than others that soft particles be limited. The Kentucky Highway Department has completed a study of 1100 miles of concrete pavement which points to chert gravels from the Tennessee and Cumberland rivers as responsible for failures in concrete pavements. The identical sand when used with Ohio river gravel or crushed limestone is satisfactory. Of course, cherts vary and some have given excellent service records. Storage in the open for considerable lengths of time may reduce undesirable materials.

Aside from the effect of demands on the quality of materials, aggregate

(Continued on page 94)



## Stockpiles

Reversible shuttle conveyor operated by Massman Construction Co. to distribute aggregates in large storage bins

**S**TORAGE IN STOCKPILES in the last few years has assumed importance as never before. For storage is needed now not merely to permit fairly continuous operation made necessary by short working days, but because it has been learned that open, outdoor storage is one way to get rid of undesirable soft material—some cherts, etc., which are hard when screened, but soften and disintegrate when exposed to the weather for a considerable time.

Storage in separate stockpiles over a belt conveyor tunnel is still good practice. The sand and gravel plant of the Massman Construction Co., Pensacola Dam, Oklahoma, provided ground storage for 10,000 tons in five sizes in this way. The conveyor, shown in the foreground of the illustration, elevates the sized material from a track hopper to a shuttle conveyor on a trestle over the stockpiles. Under the stockpiles is a tunnel conveyor which reclaims aggregates.

The stockpile area consists of five areas separated by four bulkheads 60 ft. apart and 25 ft. high, capable of storing 2000 tons of each size aggregate and sand. These bulkheads were constructed of timber poles cut on the job and set in the ground, (10 to each bulkhead, 10 ft. apart), then boarded up with plank and braced and guyed. On top of the bulkheads a 12- x 12-in. cap, 20 ft. long was

bolted, and on this stands the steel columns that support the 60-in. trusses on which the shuttle conveyor operates.

MODERN PLANTS are built of steel and concrete. Why not more concrete used by producers of concrete aggregates? The Brilliant Sand Co. plant, Steubenville, Ohio, illustrated



Above: Sand and Gravel plant of Brilliant Sand Co., near Steubenville, Ohio

herewith made its sand bin of reinforced-concrete silo staves. There's an idea for economical and satisfactory bin construction of a kind that advertises your own products. The plant has the latest American Hoist

and Derrick Co.'s slackline cable excavator and steel structures.

Four distinct units comprise the plant; the hopper and screen, the sand washing equipment, the masons sand storage silo and a gravel re-washing plant. The sand storage silo, 16 ft. in diameter and 30 ft. high with a capacity of 200 tons, is plastered on the inside to prevent leakage.

AN A-FRAME and hoist mounted on White motor-truck chassis at the Calvert Fuel & Supply Co., Detroit, Mich., sand and gravel plant is used to move the dead storage so that it can be handled by gates to conveyors under the stockpiles of a Kern storage system. A Sauerman bottomless scraper bucket operates on a cableway from the top of the A-frame to a ring on the storage distributing structure. While in the case of this plant the hoist-mounted truck was a temporary expedient, the scheme may be adaptable in other situations.

Bottomless scraper bucket operates on a cableway from the top of the A-frame to ring on storage distributing structure



# and Storage

Long stacker in large Pennsylvania quarry removes stripped material quickly and at a minimum cost



RATHER UNUSUAL is the truck scale built under a row of four bins at the Valley Park plant of Blue Diamond Corp., Ltd., Los Angeles, Calif. The Howe platform scale shown is 110 ft. long for weighing even the largest truck-trailers as they are loaded. In California, loads higher than 20 tons net are not uncommon. Having a

East. The Weston & Brooker Co., Columbia, S. C., has installed a scale 45 ft. long for long trailers.

AMERICAN AGGREGATES CORP., Columbus, Ohio, developed the method of putting material in storage, as shown in the picture, below. Belt conveyors in tunnel below the stockpiles are

sity of making and storing separately five sizes of sand?

Ground storage facilities are over 500 ft. long. About half of this is for sand storage; the other half stores three sizes of gravel. The bulkheads dividing the storage serve as supports or substructure for the sand grading and classifying plant.



long platform scale below the bins also eliminates the necessity of a second stop by the trucks for weighing. This trend toward the use of long platform scales below loading out bins is not confined to the Pacific Coast, but also is being used in the

provided for removal and blending of five sizes of sand. Who a few years ago would have predicted the neces-

IN ANY OPEN PIT quarrying operation, overburden must be disposed of in some economical way. Above is shown a very rapid way of doing the job in a Pennsylvania limestone quarry where large tonnages of clay, shale, etc., are removed and dumped out of the way of quarrying operations as quickly as removed. The stacker shown, a product of the Link-Belt Co., is self-propelled and is capable of handling large tonnages with a comparatively small, high-speed shovel. The boom extends 190 ft. beyond the front of the crawlers and has 515 ft. of 7-ply, 54-in. Manhattan rubber belting, handling 800 tons per hour. This type of stacker is now used quite extensively in Pennsylvania quarries for the quick removal of overburden.

Above: Long truck scale under bins at Valley Park plant, Blue Diamond Corp., near Los Angeles, Calif.

Below: Storage conveyors for three grades of gravel. Boot of conveyors under track permits direct unloading in the center background is the sand separation plant where five sizes are produced over storage compartments





## Latest in

Light trucks with loaded semi-trailers are cable-drawn up a sharp grade at the Verplanck quarry of New York Trap Rock Corp. The rest of the haul is by truck power to utilize the mobility of the equipment

**Q**UARRY HAULAGE is done entirely by truck-trailers at four quarries of New York Trap Rock Corp., these being located at Haverstraw, Tomkins Cove, Clinton Point and Verplanck, all in New York State. Haulage units are mainly Chevrolet trucks with Easton-Phoenix Model TR-10 side-dump trailers which handle about 16 tons of stone each from the shovels. They replace dump trucks of smaller capacity in two quarries, a steam locomotive system and an electric haulage system.

One of the photographs shows a steam shovel loading one of the new units at Clinton Point. The quarry floor is proof that the company believes in maintaining sound roadways in order to keep truck upkeep down. Several types of wearing surfaces are being tried, including sections of waterbound macadam, asphalts with various grades of chips and stone sands, etc., to determine which is best in this type of service. At Verplanck, where an electric haulage

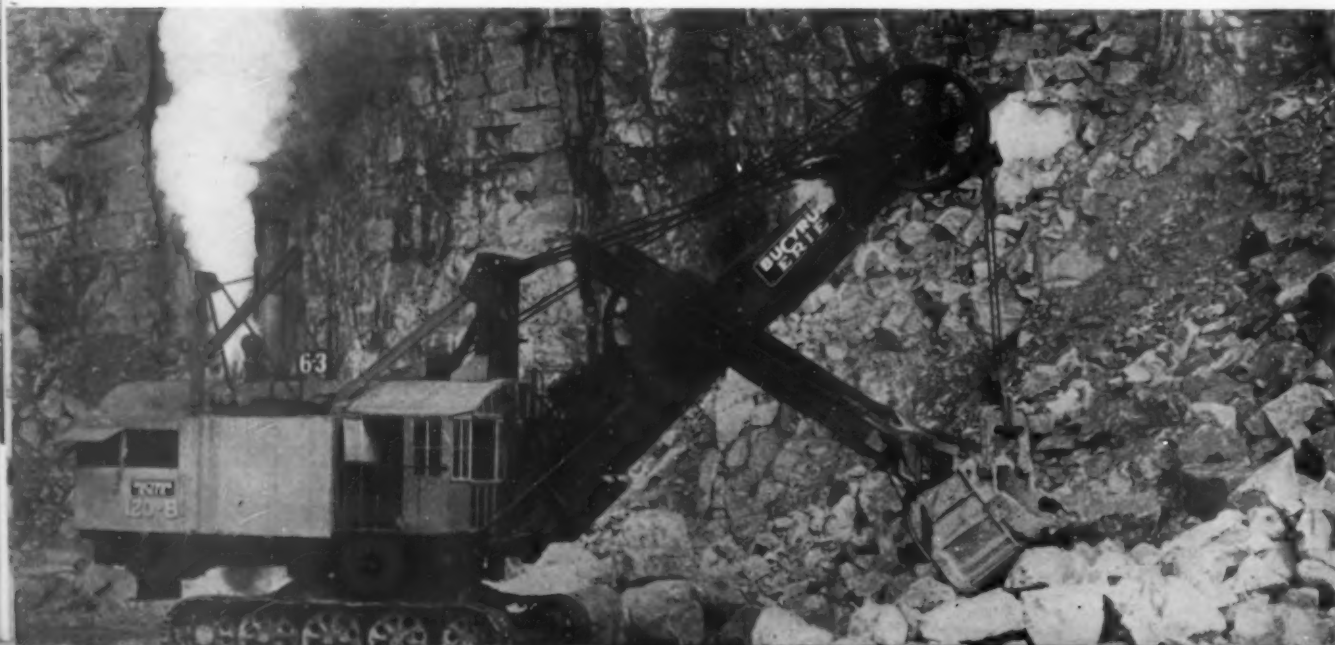
system was discarded because of space limitations as the quarry was worked to lower levels, the adaptation of truck-trailers is unique. Haulage to the crusher involves the negotiation of a 10 degree grade about 600 ft.

long illustrated in photograph No. 3. The truck-trailers operate on their own power in loading and proceeding to the foot of the incline. An electric eye control system then causes a small cable-drawn "barney car" to



Above: Semi-trailer trucks at Clinton Point. Truck maintenance costs are kept down by building and keeping good roads like the one shown

Below: One of New York Trap Rock Corp. new Bucyrus-Erie steam shovels; first new steam-driven shovels sold in 10 years. They are full-revolving with side-mounted boilers



# Quarrying

Drilling quartzite is a tough job, but Foley Bros., quarry contractors for Minnesota Mining and Mfg. Co., Wausau, Wis., are using a Bucyrus-Erie gas blast hole drill satisfactorily for this purpose



couple up with the truck and the loaded truck-trailer is pulled to the head of the incline while in neutral, at a speed of 6 miles per hour, where the car disengages automatically and the truck proceeds on its own power

to the crusher. The return trip is down another incline to the shovels. The system provides the needed speed in feeding stone to a large capacity plant and mobility at the shovel, as shown by illustrations.

## Drilling Quartzite

**D**RILLING QUARTZITE is a tough job, but Foley Bros., quarry contractors for the Minnesota Mining & Mfg. Co., Wausau, Wis., are using a Bucyrus-Erie gas blast hole drill satisfactorily for this purpose. This rock is processed for use as roofing granules and for other wearing surfaces requiring a hard material.



Above: Action photograph of LaPlant-Chonte bull-dozer powered by a Caterpillar gasoline tractor in the Clinton Point quarry of New York Trap Rock Corp., used for clean-up and piling

Below: Showing how the Oromite Co., Terrebonne, Ore., producer of diatomaceous earths, mines raw material from an open cut, using a Lima shovel and Baker bulldozer

**D**IATOMACEOUS EARTHS are increasing in use, sales amounting to 279,645 tons in 1936-38 period, coming principally from the western states but also from Florida and New York. These earths are used as polishes, fillers, admixtures, and insulation products. The illustration shows how the Oromite Co., Terrebonne, Ore., excavates the raw material by means of a Lima shovel and Baker bulldozer. No blasting is required with this material.





Left: New plant of Myers Gravel and Sand Co., Anderson, Ind., completed early in 1939

## Excavate by Slackline Cableway

**A**N ATTRACTIVE new plant was built in 1939 by Myers Gravel and Sand Co., Anderson, Ind. Its capacity is about 350 cu. yd. of washed sand and gravel per day, using for excavation a Sauerman 1-cu. yd. slackline cableway powered by an 80-hp. electric hoist.

The bucket operates on a 400-ft. slack-line. A small percentage of

oversize boulders are rejected over the grizzly at the 100-ft. mast and the throughs enter the crushing and screening plant by way of a steel hopper and chute. Screening is done over a 3-deck Simplicity vibrating screen and a 2-deck Leahy vibrating screen.

Oversize from the top deck of the first screen is crushed through a 12-

x 16-in. Universal jaw crusher. Sand is made by putting a product screened between the decks of the second screen in a settling cone and then to a bin.

## Handling Rip-Rap

**A** NUMBER of large contracts have been placed during the past year for rip-rap and jetty stone, to be used on federal and state projects, and many crushed stone companies are now busy getting out these products. In one case a separate corporation was set up to handle this business. While the production of jetty stone and rip-rap does not involve any complicated processing, it has its special blasting and handling problems. In the illustration is an 85-B Bucyrus-Erie shovel which has been equipped to lift large jetty stone to flat cars by means of a heavy wire rope sling. This view was taken in the Skukumchuck quarry near Vall, Wash., operated by Columbia Construction Co.

Below: Jetty stone quarried in Washington for Columbia Construction Co.



## Feeding by Vibration

**A** NOVEL conveyor, although not new to the Silica Co. of California, Ltd., Brentwood, Calif., is one made of seven Jeffrey-Traylor electro-magnetic vibrators attached to a 45-ft. section of 14-in. diameter steel pipe. The conveyor carries sand coming from the dryer above it up a 6 to 7 deg. rise into an elevator and is hanging freely so that full effect of the vibration is realized. This method of conveyance is particularly effective in all situations where hot, abrasive materials are handled.

In regular service the pipe lasts five years, eventually being displaced because of corrosion rather than abrasion. Vibration is applied to the pipe at an angle of 20 deg.



Hot sand from dryer is conveyed in 14-in. pipe up 6 to 7 deg. rise by means of electro-magnetic vibrators

## Segregation

**W**AYS OF REDUCING segregation in loading trucks as well as railroad cars have been developed by The Weston and Brooker Co., Columbia, S. C. A truck-loading bin was developed with special features for its control, with 45-ft. long scales below for direct weighing of truck loads to speed up their dispatch. The bin is partitioned into four equal parts (40 tons each) and is filled with one grade or blends of several grades of crushed granite by an overhead belt conveyor which reclaims the material from plant bins. Four gates and a master gate are provided, ordinary practice being to draw off from two opposite compartments, one full and one partially full, to compensate to some degree for segregation within the bin. Through the master gate the material falls on a spreader, or apron, shown in one of the illustrations. In loading a truck, a pulley arrangement is used to turn the apron a small arc to spread the load in the truck. The arrangement gives more load and helps stop segregation. Another view shows a car-loading device which has been used successfully for several years in preventing segregation in cars. Pneumatically controlled, the spreader moves back and forth across the car. Stone is released from two openings building up two piles of stone at once. Forming two cones side by side and close together retards the rolling of larger particles from either, which ordinarily go to the bottom and outside of the pile, thereby giving better distribution in the car.

The illustrations, to the right, show the truck loader and car loader devices which have proved to be such effective means of eliminating segregation.



Above: In loading trucks material passing through master gate falls on spreader which distributes load in truck and prevents segregation

Below: Carloader used by crushed stone plant to prevent segregation. Pneumatically controlled spreader moves back and forth across car





## Stripping and Stockpiling

Left: This illustration suggests the possibilities of using this type of equipment for loading from stockpiles when light trucks are employed

**H**EAVY overburdens require economical methods of earth handling. In the illustration below is shown how the Wedron Silica Co., Wedron, Ill., applies a new idea—a 1½-cu. yd. Link-Belt gas shovel loads an average of 850 cu. yd. per 8-hr. day to a haulage unit consisting of an RD-8, 95-hp. Caterpillar-Diesel tractor and two Athey Forged-Trak, 2-way dump trailers of 13 cu. yd. capacity each. Four men are required.

The entire area under work is covered by an average of 50 ft. of overburden which must be continuously disposed of well ahead of operations. With the new haulage units and gasoline shovel for excavation and loading, the total operating cost is approximately 3.8c per cu. yd., includ-

ing labor for four men, gasoline for shovel, fuel oil for the Caterpillar-Diesel engine and lubricating oil and grease for all equipment, but excluding depreciation.

Aside from lower operating costs, installation of the tractor-trailers has enabled continuous operation and eliminated the delays required while extending and relaying trackage for the older industrial cars formerly used.

With the former system, it was necessary to change the track and move the ballast after each three days of operation. Another disadvantage was that rains often washed away portions of the roadbed, causing delays to restore track to service.

**I**N THE illustration, above, may be seen how the Susquehanna Sand & Gravel Co., High Spire, Penn., uses a Caterpillar Diesel D4 tractor with Trackson high shovel at its plant near Harrisburg. In operation 22 hours a day, the tractor uses about 1½ gal. of fuel oil an hour. It is reported that the shovel loaded 80 small trucks in 10 hours. This illustration points to the possibilities of using this type of equipment for loading from stockpiles or stripping when light trucks are employed.

While this type of equipment will be recognized as having wide application by the utilities for handling aggregates and concrete on city streets, there are many jobs where it will apply in the aggregates field. In fact, the utilities and municipalities have employed this unit for stripping off excess material before paving and also for loading the overburden.

**W**HEN stripping overburden at the deposit of the Silica of California, Ltd., Co., Brentwood, Calif., Caterpillar D-7 Diesel tractors operate Carryalls, bulldozers, and ripper. On a 600-ft. haul, this equipment averages 120 cu. yd. per hour with 8-cu. yd. scrapers, working two 10-hr. shifts per day. The illustration showing this equipment in operation appears on the next facing page. This company is a well-known California producer of finer gradings of industrial sands, primarily for glass manufacture. The complete story about the processing of these sands appeared in *ROCK PRODUCTS* for December, 1939, p. 29.



Left, above: Removing heavy overburden from silica deposit. Link-Belt shovel loading Athey trailers which are hauled by a Diesel Caterpillar tractor. Center: Dumping material into spoil pit. Below: Discharging the first trailer



## Removing Overburden and Stockpiling Aggregates

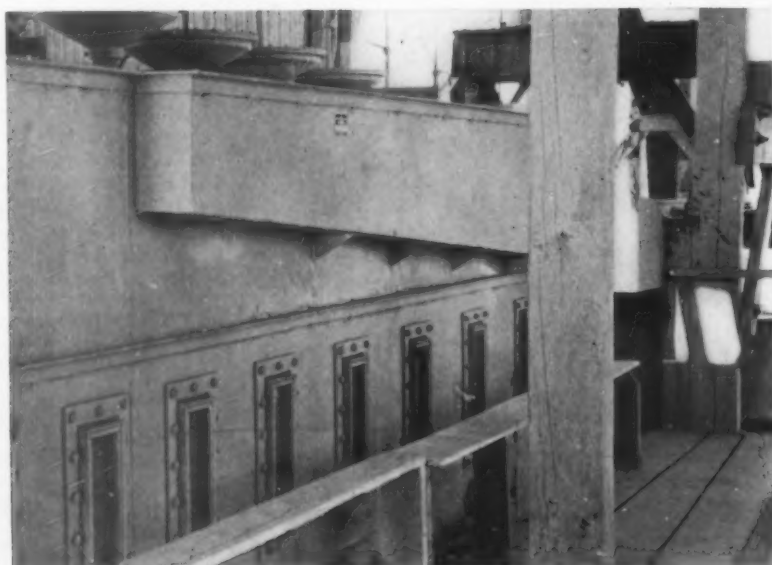
Above: Stripping overburden at the deposit of the Silica Co. of Calif., Ltd., Brentwood, Calif. Center, right: Shovel excavating gravel. Below: Stockpiling crushed stone. Bulldozers are used to keep stock-piles squared up



## CLASSIFIERS FOR RECOVERING FINE SANDS



Above: Eastern asphalt sand plant, showing a revolving screen, dewatering cones, the sizer and four classifiers in order from top to bottom



● AN EASTERN sand plant, designed to produce asphalt sand to rigid specifications, separates a  $\frac{1}{8}$ -in minus feed from the screening plant into eight fractions in a Fahrenwald 8-compartment sizer. The sizer is a hydraulic classifier operating on the hindered settling principle. Discharges from the various compartments of the sizer are dewatered through four Dorr classifiers. The various products, 8-mesh to 20-mesh, 20-mesh to 40-mesh, 40-mesh to 80-mesh and 80-mesh to 200-mesh, are stocked separately and re-combined in the desired amounts, thereby giving flexibility.

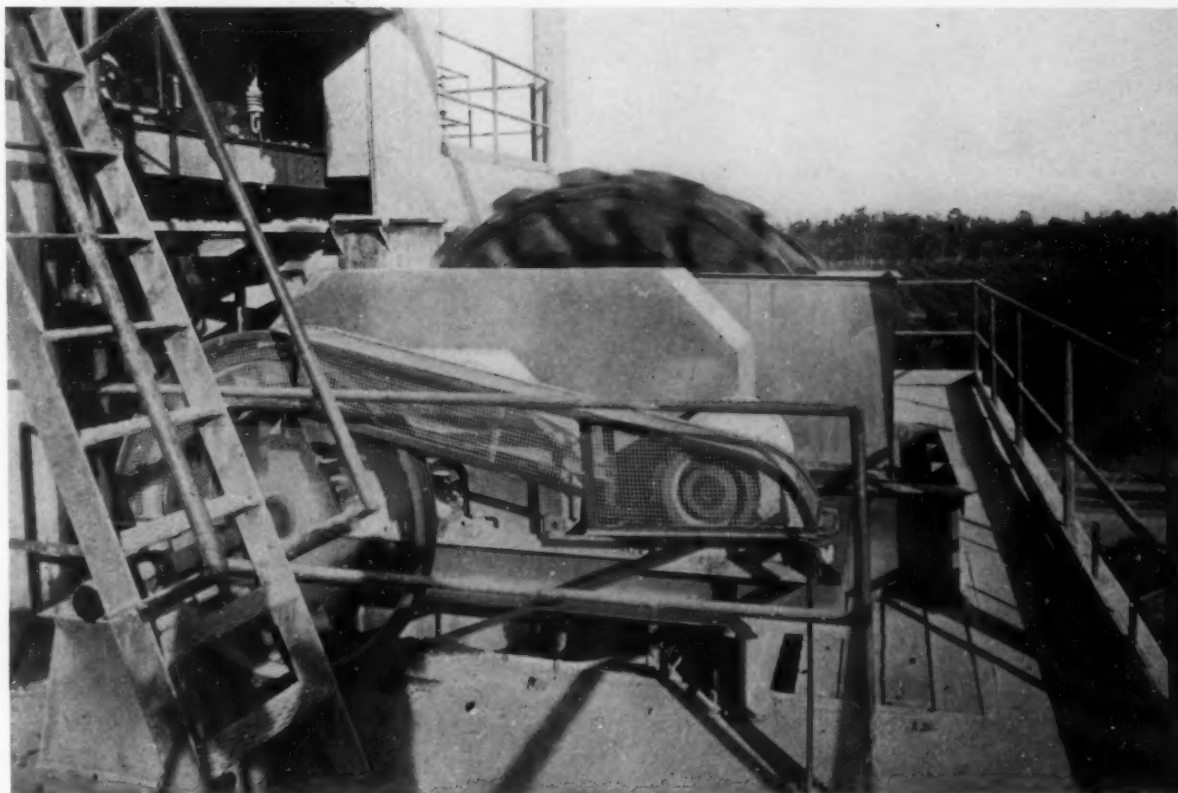
Left: Fahrenwald sizer, a hydraulic classifier, which splits the sand into eight separate fractions for later recombination



● INSTEAD of conveying silica sand discharged from Dorr rake classifiers by belt conveyor or elevator into a row of drain bins, Silica Co. of California, Ltd., Brentwood, Calif., moves the classifiers on rails over the bins. Feed material is introduced through a flexible coupling from the enclosed flume on the right at each bin location. The overflow is wasted through a continuous flume on the side into a Dorr thickener to settle the sludge. Note the crank mechanism on the axle so that one man can re-spot the classifiers. The drain bins are open-top and are filled direct from two classifiers.

Left: Showing classifier mounted on rails over drain bins at Silica Co. of Calif., Ltd., Brentwood, Calif., and crank device to move it

## DEWATERING WHEELS STAGE A COMEBACK



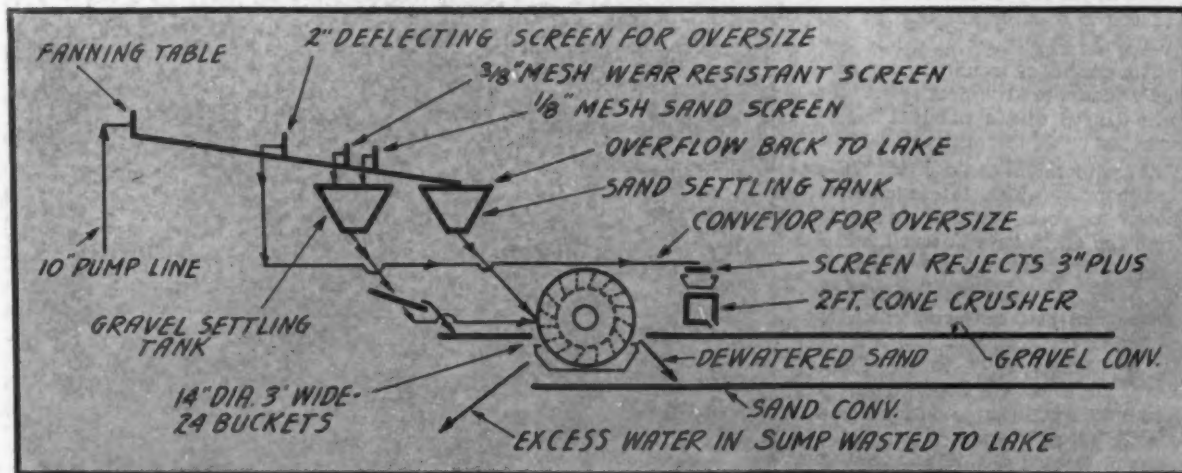
● LINCOLN SAND AND GRAVEL CO., Lincoln, Ill., and Saticoy Rock Co., Ventura, Calif., introduce an old but effective device for dewatering sand at plants recently built. They are using a simple water wheel which is a compact machine occupying very

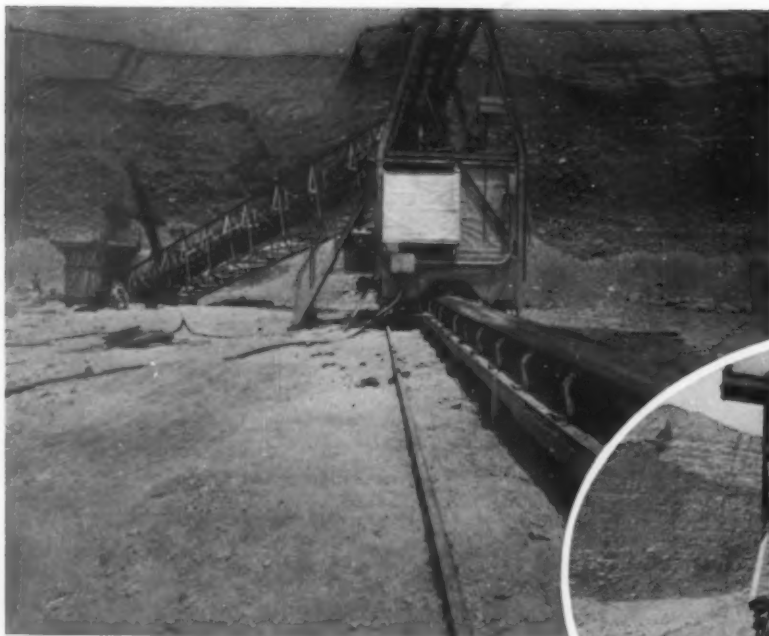
little space and which can be used also to do a job of classifying sand. At Lincoln, Ill., the sand wheel is a Simplicity "D Watering" wheel driven at 2 r.p.m. At Saticoy, Calif., either a minus 4-mesh or 6-mesh feed is put into the machine to produce either concrete sand or plasterers sand. The wheel revolves on a horizontal shaft and the buckets, after passing the top position, spill the sand out into a

Above: Action photograph of sand wheel in new plant of Saticoy Rock Co., near Ventura, Calif.

Below: Flow diagram of Lincoln Sand and Gravel Co. plant, showing sand dewatering wheel in center

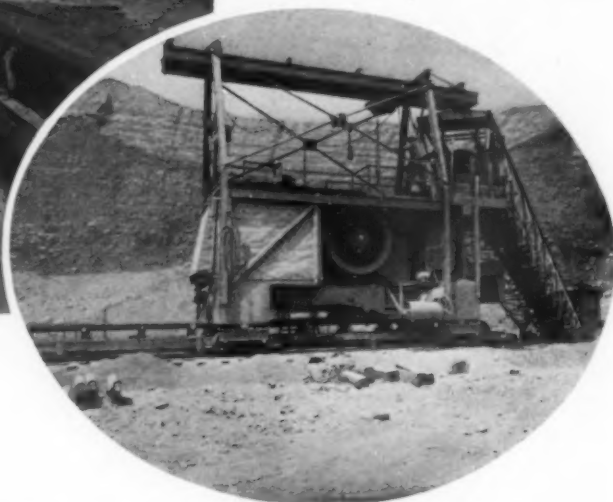
hopper. Adjustments are the pitch of the 20 buckets, which may be changed to vary the depth to which the wheel digs, and the height of the overflow weir. The buckets are perforated to drain off water while the sand is being elevated from the settling tank in which wheel revolves.





## Unique Screen

Left and below: Two views of crusher car in pit of John D. Gregg, Roscoe, Calif. By swinging the feed belt conveyor and moving the crusher car less frequently, large boulders are crushed to reasonable size near excavation



### Crusher On Wheels

**P**UTTING the primary crusher on a mobile specially-designed car on rails has extended the utility of belt conveyor transportation in the pit of John D. Gregg at Roscoe, Calif., near Los Angeles. Mr. Gregg's pit contains sand, gravel and boulders which, if uncrushed, have a tendency to roll when transported by belts, especially when carried up a steep grade.

The other alternative, with the crusher at the plant, would be to reject large boulders in the pit, thereby sacrificing considerable good material. In the arrangement shown, a 28 x 36-in. Traylor jaw crusher receives its feed from a pendulum swinging belt conveyor and movable field hopper. A small percentage of boulders, larger than 21-in., is rejected at the hopper and all boulders reduced to 5 in. or less through the crusher.

The crusher is mounted on a specially designed two-deck steel car with flanged wheels which is hand-propelled on 90-lb. rails spaced 10 ft.

At each location of the crusher, the feed hopper, which is sectional, is moved to work out the immediate area, and about once in four months the crusher car is moved.

The hopper feeds out material to an inclined belt conveyor which is pivoted at the head pulley. The hopper is filled by a 1½-cu. yd. Lima shovel. About once a month the field hopper is moved. A gathering cable is run through four cable slings fastened to each section and hooked

to the dipper teeth when making a move.

The conveyor extending beneath the crusher is of bolted, 20-ft. sectional channel construction.

Below: Crusher on Keystone dredge, which crushes gravel by impact. Direction of throw against the breaker plates is reversible in this machine

### Impact Crusher

**O**NE of the first producers in the East to use an impact crusher on gravel is the Dravo Corp., Keystone Sand Division, Pittsburgh, Penn., which has one on a ladder dredge to crush oversize gravel for inter-mixing with washed, uncrushed



# and Crusher Applications

gravel and for the production of crushed gravel.

The crusher may be operated at any speed between 300 and 900 r. p. m.—the higher speeds for finer products. Direction of rotation of the hammers is reversible, with breaker plates at each end and there are no grate bars to obstruct the discharge of the crushed gravel. Pennsylvania Crusher Co. manufactured the crusher, designated as C-9-38 Impactor.

## Screening Where You Need It

**T**HREE applications of screening are shown which demonstrate the versatility of screens for different purposes. One view shows a 3- x 6-ft. Universal vibrating screen located below a gravel hopper for truck loading at the plant of the Racine Sand and Gravel Co., Racine, Wis.

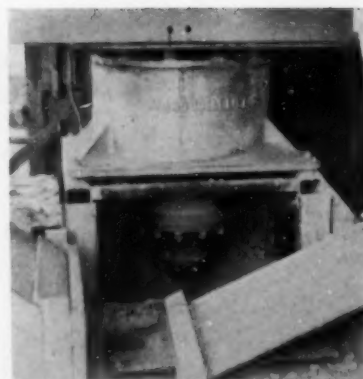
This unit serves to scalp out any oversize or trash that may be in the hopper, to change the gradation to meet a new specification, and also helps to prevent segregation. The second illustrates a combination portable loader and revolving screen at the stone plant of Berks Products Co., Reading, Penn.

The third picture shows a type C Universal vibrating screen used by the Manly Sand Co., Rockton, Ill., as a scalper for moulding sand, the oversize being carried away by the short horizontal conveyor to a second paddle mill to break up lumps before

the material is again moved by conveyor to a similar screen for final sizing.

## Reduction Crusher

**N**EW-TYPE gyratory-principle reduction crusher installed during 1939 by John D. Gregg, large California aggregates producer, at Roscoe, Calif., is shown in the accompanying photograph. The crusher and surge bin overhead were placed to receive either crushed or uncrushed gravel from other parts of the plant by conveyor belt or gravity and to return the crusher output by belt conveyor to a crushed gravel screen. As a measure of its performance, with a 2½-in. crusher-buried feed, about 40 tons per hour of crushed



Above: High speed gyrating crusher of new type in plant of John D. Gregg

recently developed by the Allis-Chalmers Manufacturing Co. It operates on the gyratory principle but at a speed higher than usual gyrating speeds, and the stroke is designed to contribute toward a cubically-shaped product. This design



Above: Portable loader with revolving screen to re-screen stone while loading from stockpiles

material, 100 percent passing ¾-in. sq. openings, are produced. The drive is a 25-hp. motor. The crusher is a No. 322 type R reduction crusher

with manganese wearing parts is a good example of the current trends toward wider usage of special metals wherever there is impact and abrasion.

Below: Screen under a gravel hopper to remove trash or oversize. It's also adaptable for re-screening and in preventing segregation

Below: Arrangement of vibrating screen in a moulding sand plant which "conveys" oversize onto a belt



## POWER UNITS WHERE



Left: Three individual drive gasoline engines operate two crushers and an elevator

**L**IN HUMPHREYS, operating a small quarry near Charleston, Ill., has found various uses for individual gasoline power units. The illustration shows two L-90 and one W-25 Allis-Chalmers engines driving, respectively, a jaw crusher, secondary crusher, and elevator to the screening plant. These units are high compression gasoline engines of 88 and 25 hp., respectively. There is a very definite place for individual drive power units of this type in the small plant where electric power service is not readily available and where a large central power unit is not economical where operations fluctuate.

**D**RY CLEAN aggregates (eliminating soft particles) and save the dust! That's how Lime Bluff Co., Muncy, Penn., kills two birds with one stone. Very fine dust is saleable whether limestone or not. Also removing it makes a more healthful, cleaner plant.

An 18,000 c.f.m. fan pulls the dust from a cleaner drum into an 8-ft. Sprout-Waldron cyclone collector. Product is 12 tons of dust per 10 hours of operation, sold to farmers. The drum is 6 ft. in diameter and 55 ft. long with a shell thickness of  $\frac{1}{2}$  in. All  $\frac{1}{4}$ -in. to  $1\frac{1}{2}$ -in. stone, representing 30 to 40 tons per hour of the output, is taken from the plant bin gates over a 20-in. belt conveyor,

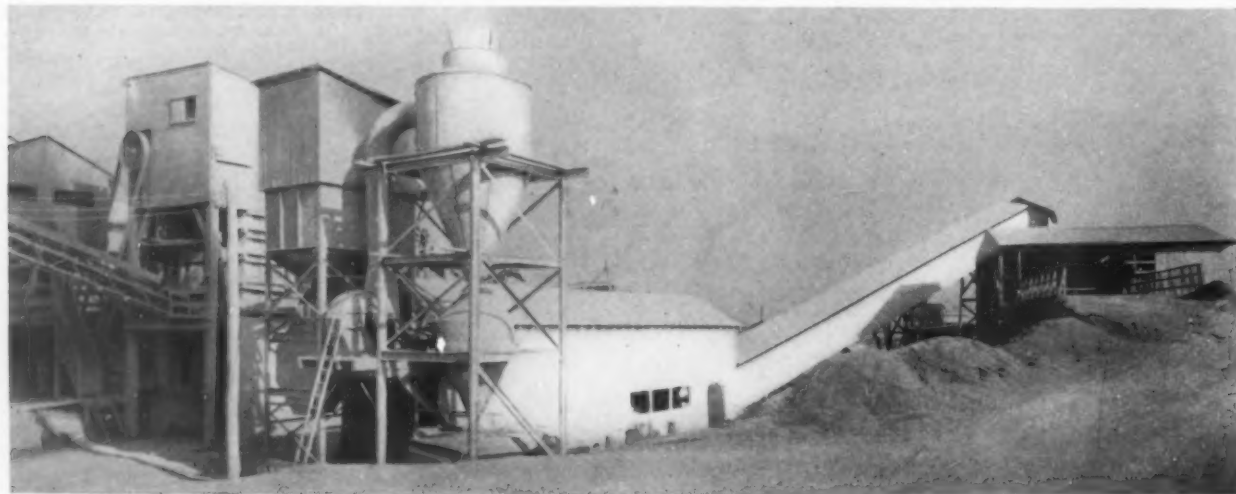


40-ft. centers, and placed in a 20-ton bin over the feed end of the drum.

About 25 ft. of the lifter blades within the drum are perforated to allow dust to filter through.

Above: Typical of the trend in many drilling operations is the picture illustrating Ingersoll-Rand FM-2 wagon drills and a K-500 portable compressor

Below: Plant of the Lime Bluff Co., which "dry cleans" its products



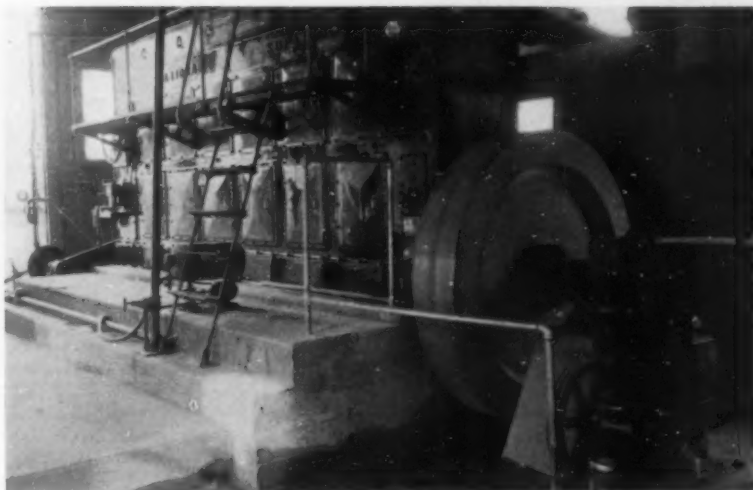
## THEY ARE NEEDED

**N**O POWER LINES mar this Pennsylvania rural landscape. Narehood Bros., Milton, Penn., like many producers of crushed stone and other aggregates make their own electric power at low cost (two cents per ton of finished product) with a 575-hp. National Superior Diesel engine, direct-connected to an electric generator.

Equipment comprises a primary crushing unit, a secondary crushing unit with provisions to pass or bypass any amount of the product to the washing plant. At a second washing plant, stone reclaimed from the dry plant bins is screened after fur-



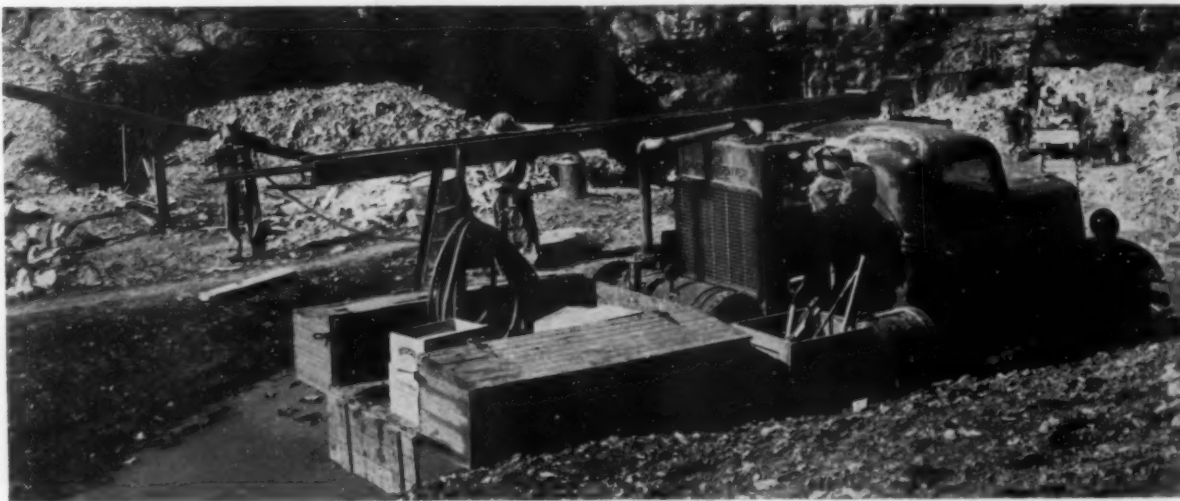
Above and to the left: Compactly built stone plant of Narehood Bros., Milton, Penn., and the Diesel-electric power unit which develops all the power



ther reduction or after by-passing the crushing unit (Rock Products, June, 1939).

Below: Portable compressor mounted on truck has advantages in isolated quarry locations

**T**YPICAL of the trend in many drilling operations is the picture, on page 80, illustrating the use of wagon drills. These drills have taken the place of well drills for many types of blasting work. The view shows Ingersoll-Rand FM-2 wagon drills and a K-500 portable compressor.



## INCREASING EFFICIENCY OF DREDGES

**I**NTERESTING new sand and gravel plant designed and equipped by the Link-Belt Co. for the Shelby County Commission, Memphis, Tenn., is shown here. It's a hydraulic opera-

The cutter, rather than being a continuous series of digging links, as are those customarily used, consists of rotating blades turning just ahead of the suction pipe opening. The

**S**AFETY for floating equipment is suggested in the illustration of the method of supporting dredging machinery at the Underwood-Walker Co. sand and gravel plant, Millbrook, Ala. Any one of the six 6½-x 33-ft. ¾-in. steel pontoons may be removed easily and repaired if necessary—and the chance that more than one would become leaky and endanger the equipment, at any one time, is practically nil. Having the pontoons arranged sideways rather than just along the sides of the dredge appears to be a more stable



Above, left: Showing, in raised position, how the cutter is driven off a shaft outside of and parallel to the suction pipe. Below: Arrangement of new Memphis plant with separate triples for sand and for gravel



tion with a central screening plant and gravel bins and sand bins on either side as shown in the illustration. Delivered capacity of the 10-in. Amsco dredge pump is 200 tons per hour. Discharge from the pump line is into a wooden mixing chamber and then into a 48-in. by 18-ft. trommel screen where sand is separated from gravel. Other equipment includes a 20-in. diameter double-paddle type gravel washer, a PD-236 positive drive type double-deck vibrating screen to size gravel, a sand dewatering screw delivering sand to the sand bin 18-in. belt conveyor, and two 18-in. troughed belt conveyors to the gravel bins. Gravel bins have Link-Belt duplex undercut gates and sand bins, the standard L-B gates.

The other illustration is of the dredge which has a dredge cutter developed by engineers at the plant.

blades shown protruding through the enlarged end of the suction pipe in the illustration are driven off the long shaft seen outside and parallel to the suction pipe.

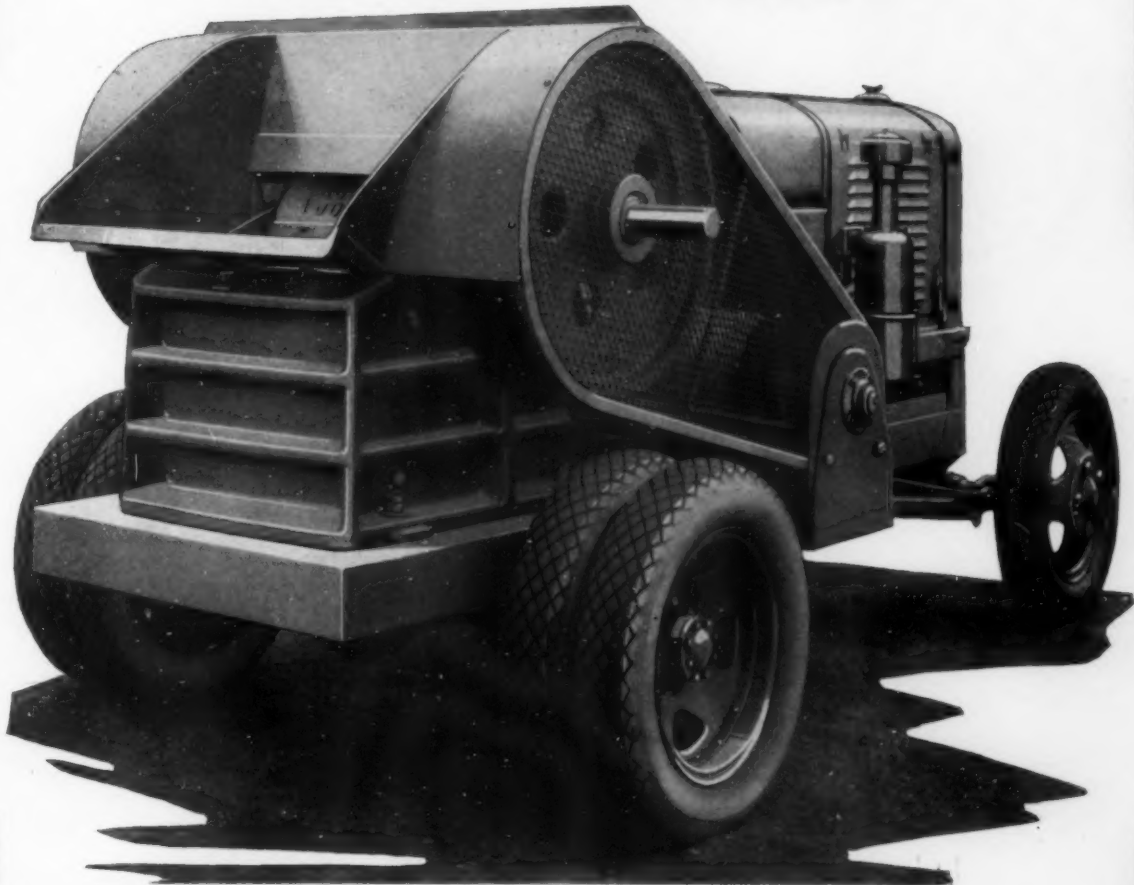
arrangement in the event one would become leaky. Many operators of hydraulic sand and gravel plants build their dredges with oil tanks from railroad cars as pontoons.



Right: Arrangement of pontoons on a sand and gravel dredge so that any one may be easily removed for repair

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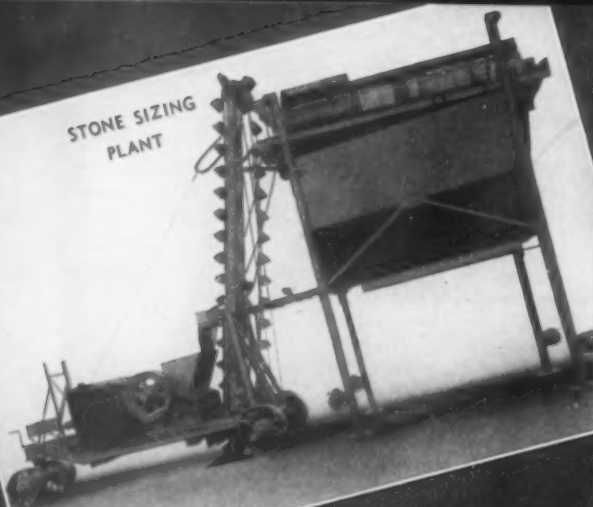
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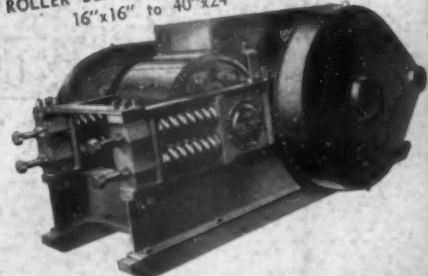
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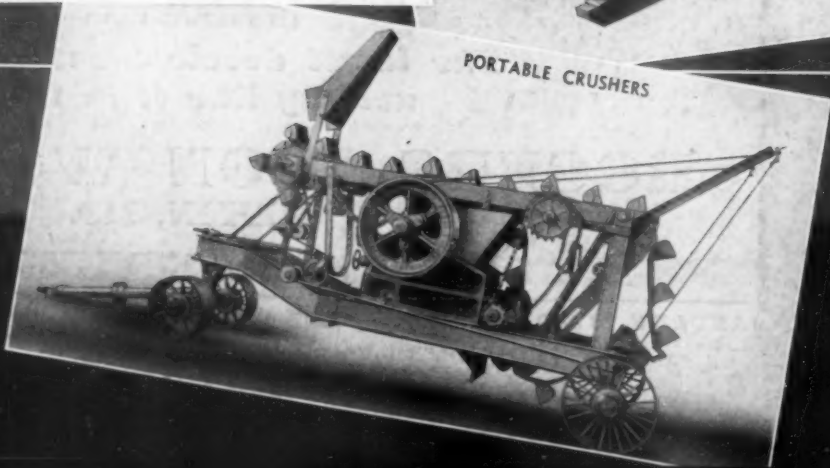
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ROLLER BEARING JAW CRUSHER  
9"x12" to 25"x40"

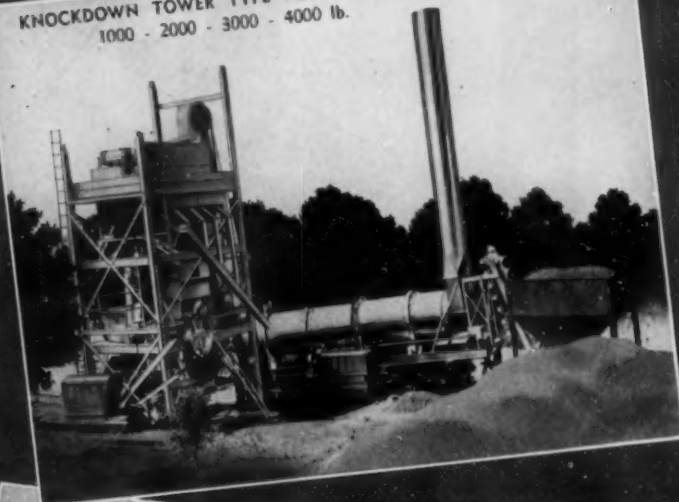


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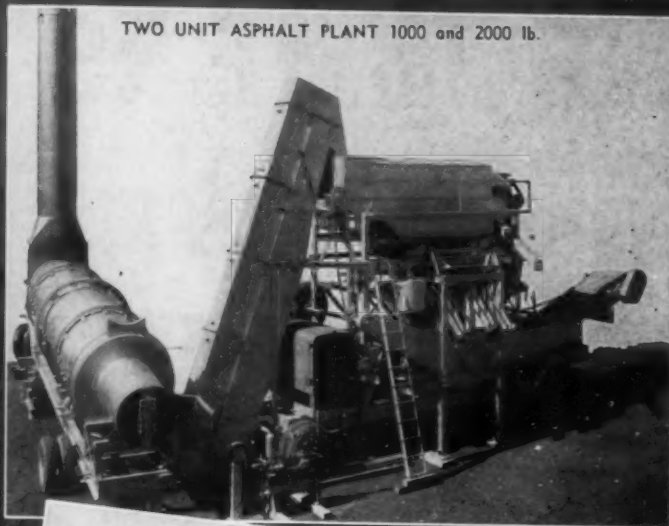
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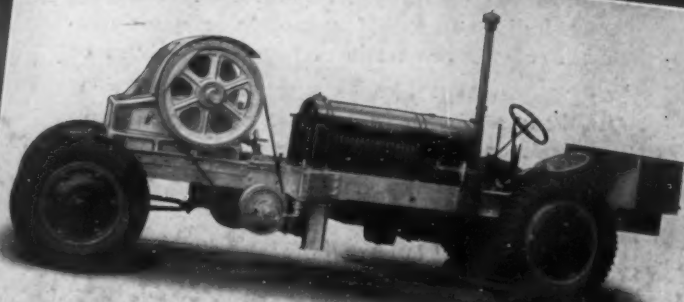
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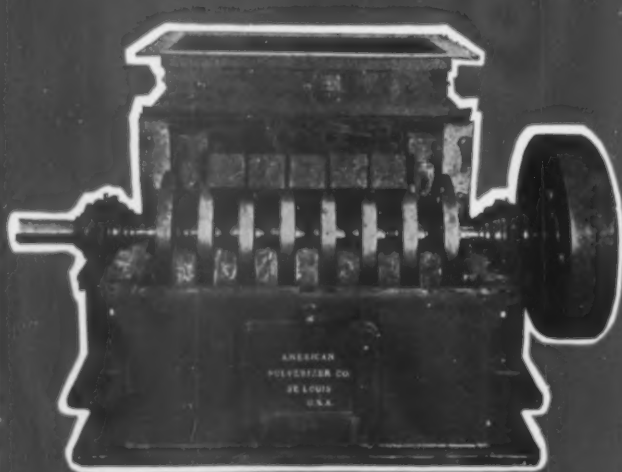
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Front view showing crusher plate adjustment.



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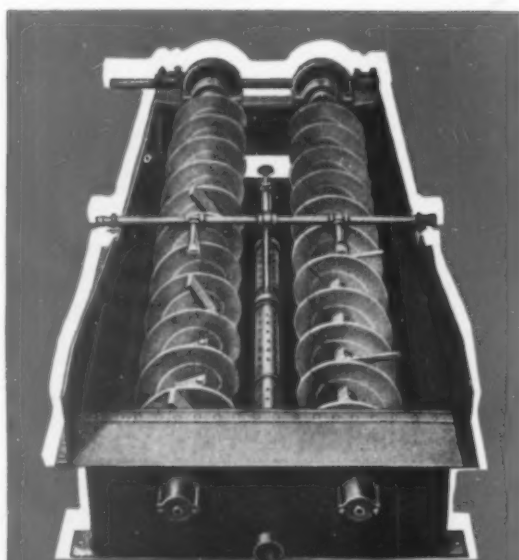
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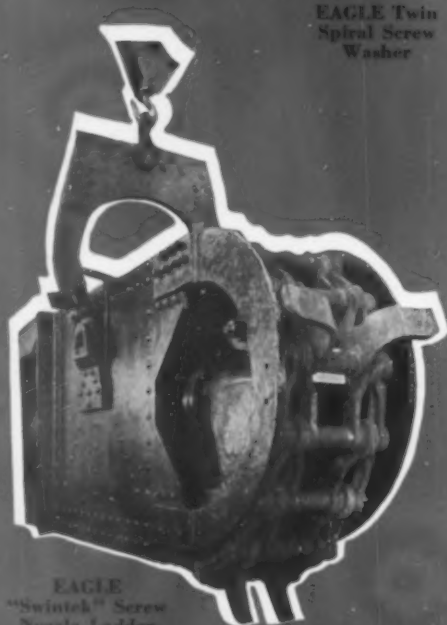
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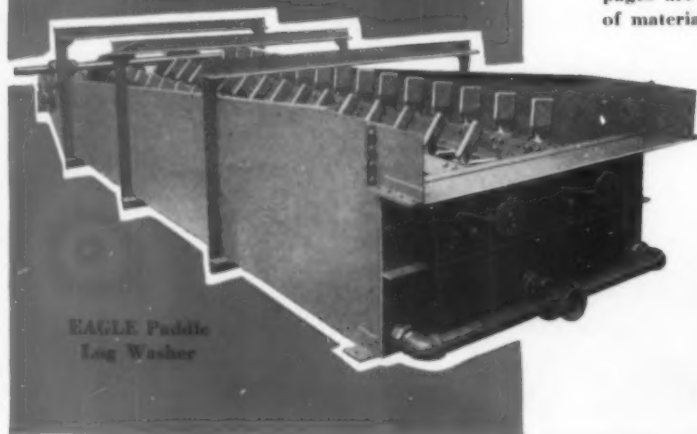
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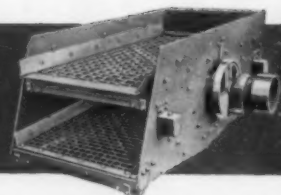
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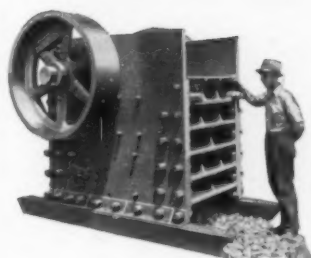
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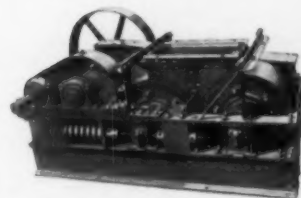
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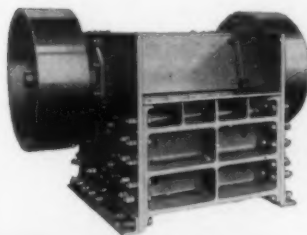
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The A-W 940 (below), operating with force-feed motion, handles stone up to 8 inches, for reduction to any size from 3 inches to  $\frac{3}{4}$  of an inch. As in other A-W Jaw Crushers maintenance costs are low and output high, thanks to oversize roller bearings and shafts operating at high speeds.



A-W Roller Bearing Jaw Crushers are built in seven sizes. All are the time-tested force feed, overhead eccentric type. Available on skids or in innumerable combinations with elevators, conveyors, etc. The No. 2138 illustrated above is particularly suited for quarry service or in pits, handling rocks up to 20 inches.



A-W Roll Crushers (above) have heavy manganese steel shells on both rolls; fixed shafts rotate on SKF self-aligning roller bearings. Chain drive for maximum reliability and flexibility. Exceptional capacity. Inexpensive to maintain.

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The Austin-Western Line is plant-proved to meet a wide variety of fixed and portable plant needs. And each piece of equipment in the line features distinctive high output qualities that effect savings in operating and maintenance costs . . . while contributing to that smooth, balanced production which assures maximum operating profits. Write for full particulars on A-W Jaw and Roll Crushers, Conveyors, Revolving Screens, Gyrating Screens, Complete Portable Crushing Screening Plants, and Washing Plants. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

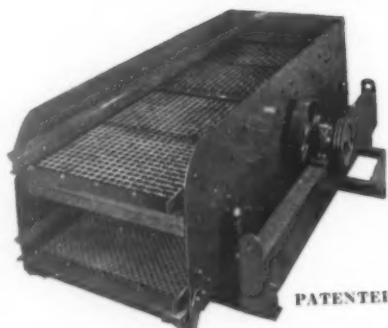
## Austin-Western

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## The Vibrating Screen with the Fully Controlled Motion

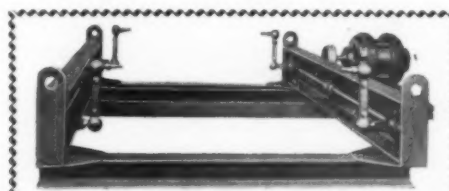


In SECO, foreign vibration is practically eliminated. There is no rocking or bobbing of the screen. SECO does not vibrate your supporting structure. The Screen is balanced and stays in balance, which minimizes wear and strain—particularly on bearings.

Your screening operation would be settled for some time to come by installing SECO.

Start the new year right with your screening problems solved by SECO. The patented equalizer assembly, which is an exclusive SECO feature, gives the entire screening surface a fully controlled and uniform circular motion. There are no "dead" areas which cause poor screening action and slow down production.

Many producers have actually acquired new customers thru the very accurate sizing of their SECO-screened material.



Available only on SECO—this is the patented equalizer assembly which connects the gyrating body to the base frame and positively assures a uniform "circle throw" motion to every inch of screening surface.

### SCREEN EQUIPMENT CO., Inc.

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BUFFALO, N. Y.

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For vibrating, revolving and shaking screens, there is no more efficient screening medium than Hendrick Perforated Plate. It is available in any size or shape of perforation, flat or double corrugated. Its full clearance prevents clogging and its uniform mesh is maintained for the life of the plate. Made of hard tempered steel it resists abrasion and has a long life that reduces screening costs. Write for complete information.



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Light and Heavy Steel Plate Construction

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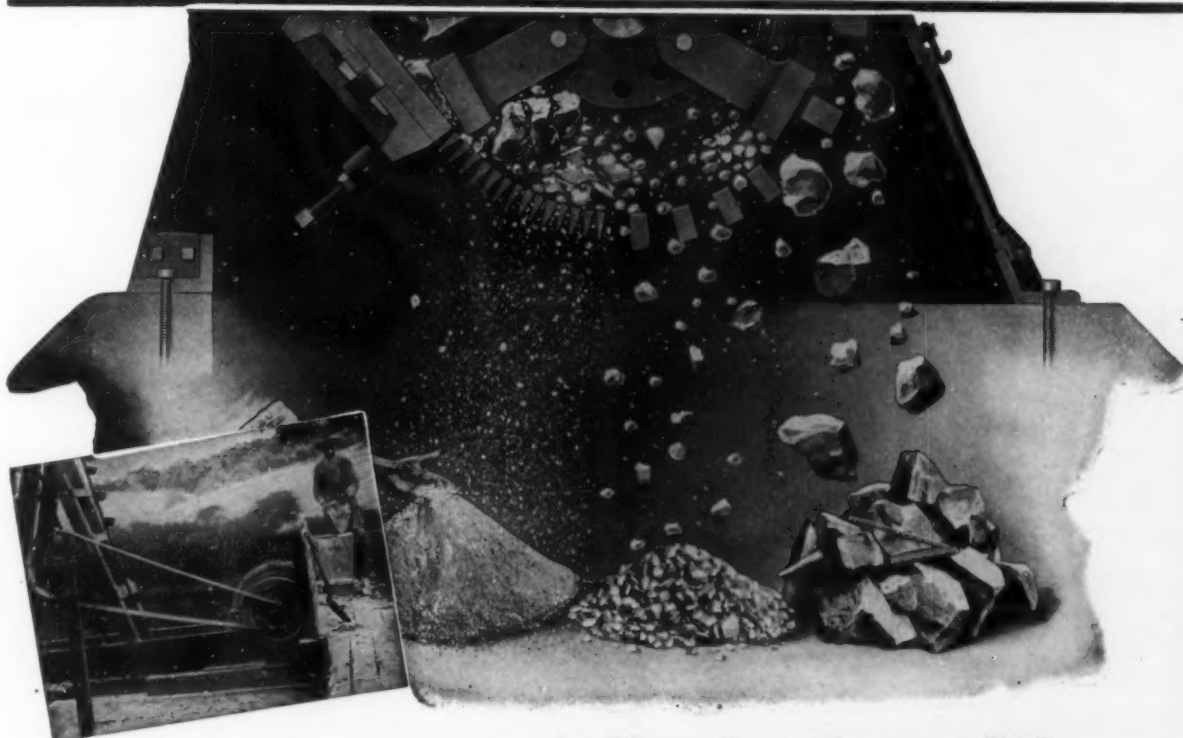
Makers of Mitco Open Steel Flooring, Hendrick Mitco  
Shur-Site Treads, Hendrick Mitco Armorgrids.

# Williams Hammer Crushers

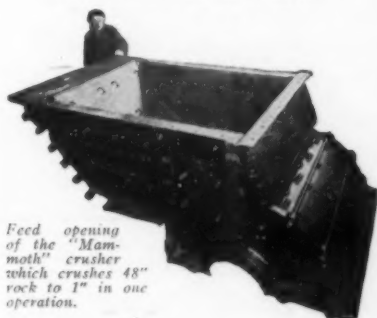
Handle Larger Rock

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The "Slugger" which reduces "one-man" size limestone to 1", 3/4" or agstone



Feed opening of the "Mammoth" crusher which crushes 48" rock to 1" in one operation.

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The "Mammoth" crushes 48" rock to 3", 2" or 1" in one operation. Takes the place of a primary breaker and recrusher.

The "Jumbo" reduces 20" to 30" rock to 1 1/4" and smaller.

The "Slugger" crushes screen rejects or "one man" size rock to 1", 3/4", 1/2" and finer.

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The "Non-Clog" for crushing wet muddy rock. Cannot be clogged.

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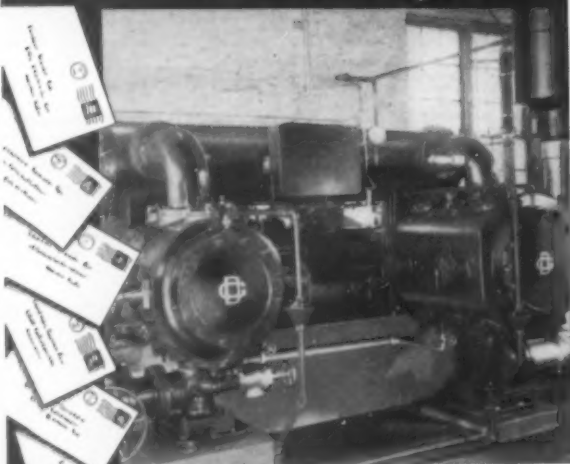
OAKLAND, CALIF.  
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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD  
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**SAVES \$210<sup>00</sup> Every Month  
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A saving of \$210.00 every month has resulted from the installation of a Gardner-Denver HAF 14" stroke air compressor with synchronous motor drive, in a large mid-west plant. This saving is due to the fact that the Gardner-Denver Compressor increases air output more than 50%, makes possible an improved plant power factor.

In their reports on the performance of Gardner-Denver class "HA" Horizontal Air Compressors, users have written a far better story than we could ever tell. In addition to their increased operating efficiency, Gardner-Denver "HA" Compressors also make possible substantial economies in maintenance. Five-step clearance control regulation, with magnetic control governor, saves you money by fitting air output to air needs exactly. Before you invest in any air compressor, get the complete facts about Gardner-Denver class "HA" Compressors. Write for our free bulletin! Gardner-Denver Company, Quincy, Illinois.

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Resolve, now, to include in all specifications for 1940, wearing parts of TISCO Manganese Steel. For no other steel provides the uniformly long and low-cost service which TISCO affords. For no other steel is TISCO made... with uniformly correct manganese content, and exacting control in every manufacturing and heat treating process. Be sure you get all the benefits of this tough, long-wearing steel in '40, by making sure all wearing parts are TISCO made.



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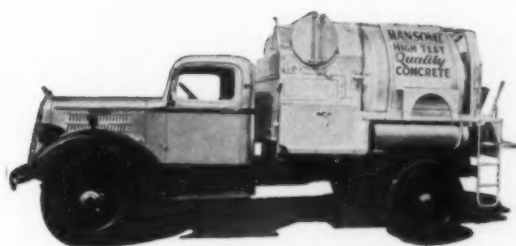
**NATIONAL CRUSHED STONE CONVENTION  
NATIONAL SAND AND GRAVEL CONVENTION  
BE SURE TO DROP IN AT THE TISCO BOOTH AT EITHER SHOW!**

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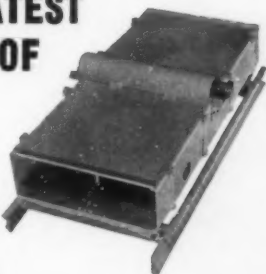
EFFICIENCY, ECONOMY,  
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These facts demand your  
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The UNIVERSAL Line for 1940  
represents a truly — GREAT  
SCREEN VALUE. They cost so  
little,—yet they will contribute  
tremendously to your success in  
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Presenting -- "UNIVIBE"  
UNIVERSAL'S VIBRATORY  
RIDDLE

UNIVERSAL'S new light weight vibratory riddle is de-  
signed particularly for test purposes, preparation of  
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Weights only—39  
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May be operated  
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## Tough Requirements for Aggregates

(Continued from page 67)

gates plants in many localities produce to as many as 13 to 15 specifications at one time. This condition, too, is attributable to customer demands but also to the expansion of markets by producers' efforts. The slag industry parallels the sand and gravel and crushed stone industries in this regard. All are using more reduction crushers and more screening surfaces. Roll crushers seem to predominate for fine reduction except in the slag plants, which gen-

erally have large capacities and many of which are utilizing high capacity reduction crushers such as gyratories and cone crushers.

From the looks of things, crushing will be concerned more with shapes of particles in the future. There's a tendency, at least in some parts of the country, to place a premium on aggregates which are predominantly cubical in shape or at least free from very elongated pieces. There does exist a controversy as to comparative particle shapes as produced by the various types of crushers on the market. There have been many improvements made on the standard

types of crushers used which have been engineered to influence particle shapes. Several impact crushers, developed in recent years, have been placed in operation in aggregates plants. These crushers operate on a new principle, breaking down gravel or stone by throwing the pieces against breaker plates, rather than squeezing them.

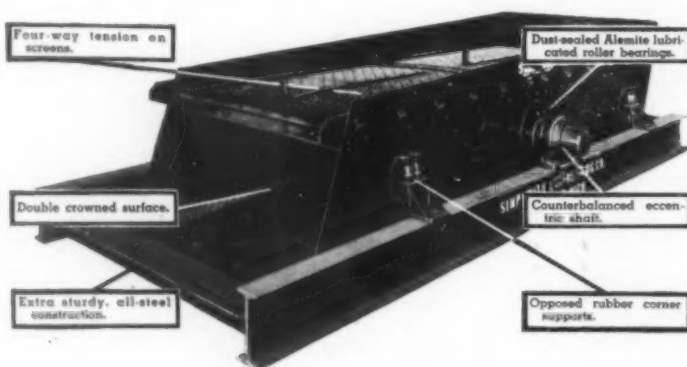
During the past year the States of Kentucky and Pennsylvania have adopted square openings as standard for testing sieves. Consensus of opinion among producers is that square openings are preferable, since square openings are more effective in screening small sizes in the plant, so it is a step in the right direction.

## CLEANER MATERIALS MORE ACCURATE SIZING

—SAY CUSTOMERS OF LARGE WESTERN FIRM USING *Simplicity* SCREENS

Recently the head of a large Aggregate Producing company in the West made this statement. — "I've always understood that Simplicity Gyrating Screens were good, but I didn't realize how good they are until after I installed that 4'x 10' triple deck screen in one of my plants. No other screen is one, two, three, when compared to a Simplicity. Hardly a day goes by without some one of my customers making some comment about how perfectly sized and cleaned my material now is. From now on its Simplicity screens for me — the best aggregate screen on the market."

You, too, can insure better cleaned, more accurately sized aggregates by installing a Simplicity Gyrating Screen. Write today for complete facts and prices.



**Simplicity**  
ENGINEERING COMPANY • DURAND MICH.

### Quarry Developments

Late in 1939, New York Trap Rock Corp., New York, N. Y., purchased two new steam shovels, the first new ones sold in the industry for ten years or more. They are full-revolving with boilers mounted cross-wise and are equipped with crawlers. It will be interesting to compare performance of a modern steam shovel with electric and Diesel-powered shovels of the same size.

On the West Coast, Grant-Pacific Rock Co., Lindsay, Calif., has converted a gasoline engine driving 3-cu. yd. dragline to burn butane. Butane is a petroleum derivative, originally a gas, but liquefied under pressure for handling in pressure containers and then re-converted to a gas for mixing with air in the carburetor. Fuel cost on the dragline is about 26 percent of the cost with gasoline.

Large earth movers powered by Diesel tractor equipment continue to interest producers who have heavy overburden to remove and in some cases are used for raw material excavation where the matrix is of loose material. Graham Bros., Inc., Los Angeles, Calif., uses two of these units exclusively in their new El Monte plant. The plant produces 400 tons per hour of rock, sand and gravel, and uses 4½ to 5 gal. of fuel per hour for each tractor. For quarry haulage there is a pronounced trend toward large capacity semi-trailer trucks which combine high capacity with mobility at the shovel.

A spectacular transportation system, which must bear out the economy of belt-conveyor operation, at least under some conditions, is the 9.6 miles of belt conveyor to be used by the Columbia Construction Co., Inc., to deliver aggregates from Redding, Calif., to the site of Shasta dam. The conveyor is being built in 26 sections of 6-ply, 36-in. belting and will handle 1100 tons per hour.

## PROVEN PERFORMANCE

*on Hundreds of Jobs!*

**"Smith-Mobile Provides Faster,  
More Efficient, More Convenient Operation"**

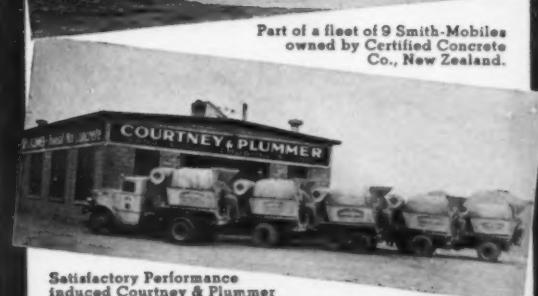
That's the verdict of Ready Mixed Concrete Operators in all parts of the country. Their experience shows that Smith-Mobile leads the field because of *high discharge, fast or slow controlled discharge, feed chute charging, visible mixing, etc.* Five sizes. Ask for Catalog No. 198.



Pacific Coast  
Aggregates Inc. fleet of  
10 three yard Smith-Mobiles.



Part of a fleet of 9 Smith-Mobiles  
owned by Certified Concrete  
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Satisfactory Performance  
induced Courtney & Plummer  
to order and re-order 5 times.



C. S. Barlow & Sons,  
Tacoma, Wash. are enthusi-  
astic owners of 5 Smith-Mobiles.

Visit The T. L. Smith Company Booths at the St. Louis Ready-Mixed Concrete Exposition and Chicago Road Show. Get the complete Smith-Mobile story.

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THE *Modern* TRUCK MIXER and AGITATOR

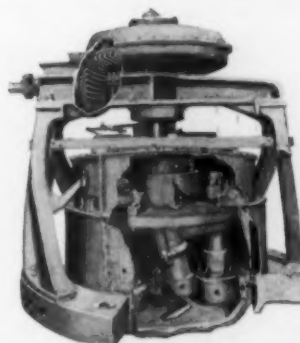
## BRADLEY PULVERIZERS

FOR CEMENT AND  
AGRICULTURAL LIMESTONE PLANTS

WE OFFER a complete line of pulverizers for the reduction of Limestone, Cement Clinker, Agricultural Limestone or any Refractory Material where a Finely Ground Finished Product is required.

**The JUNIOR HERCULES MILL**  
—specially designed for the Agricultural Limestone Industry—A large capacity mill that meets every specification of the Federal Agricultural Conservation Committee. A mill to meet your requirements at surprisingly low operating costs.

*Designed for Agricultural Limestone  
Low Power Consumption  
Low Maintenance Cost  
Reasonably Priced  
Produces Finest Quality Agstone*



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**PULVERIZERS and AIR SEPARATORS**  
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Capacities: 1 to 50 Tons Per Hr.*

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# WASHERS, WASHERS EVERYWHERE

NORTH, EAST, SOUTH AND WEST

**McLanahan Machines Are Always The Best**



Cleaning sand and gravel in a New York State aggregates plant



Washing sand and gravel with a log washer in a Maryland plant



Single log washer scrubbing manganese ore in Puerto Rico



Washing crushed trap rock in a large Eastern stone plant



McLanahan improved light duty logs on crushed limestone



McLanahan giant scrubber used by a large steel corporation



Removing tough clays from phosphate rock in the Tennessee field



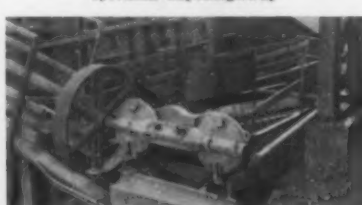
Cleaning limestone for construction of Pennsylvania superhighway



McLanahan giant scrubber and screen cleaning flux rock for furnaces



Removing refuse from sand and gravel in an Illinois plant



McLanahan patented log washers cleaning crushed limestone



Removing tough clay and soft rock from different sizes of limestone



New and old style McLanahan logs removing tough clays from cement rock



A two washer plant scrubbing limestone in central Pennsylvania



Heavy duty 30 foot logs cleaning limestone for Pennsylvania superhighway

## McLanahan & Stone Corporation

ORIGINATORS OF STEEL LOG WASHERS AND SINGLE ROLL CRUSHERS

HOLLIDAYSBURG

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### Convention Program

EXECUTIVE SECRETARY AHEARN sent out a letter to the members of the National Ready Mixed Concrete Association and the National Sand and Gravel Association outlining the program for the annual conventions to be held January 17-19 at the Hotel Jefferson, St. Louis, Mo. The programs for both conventions are built around the round-table approach more than they ever have been. Discussions will be led by men in the two industries with plenty of opportunity for the discussion of daily problems of the industries from the floor.

Some of the fundamental questions to be examined that are of interest to both industries are as follows: the private construction outlook for 1940; effect of the war on our building program; the outlook for federal and state highway appropriations in 1940; the proposal that 50 billion dollars be spent in the next 20 years for highway and street improvements; the proposal for a superhighway program; business conditions in the sand and gravel and ready mixed concrete industries and prospects for 1940.

The live round-table discussions on ready-mixed concrete that highlighted last year's convention will be repeated at St. Louis. Some of the questions up for discussion are: proper designs of concrete mixtures; the status of purchase specifications in various localities; limitations on length of haul; prohibitions against the carrying of wash water and the use of wash water as part of the mixing water for subsequent batches; truck capacity limitations; cold weather handling and control; merchandising, advertising and other subjects equally as important.

Of particular interest to producers of sand and gravel will be discussions of trends in specifications, requirements for the elimination of soft and other deleterious materials, the functions of specifications, screening efficiency, the elimination of soft particles, the production of crushed gravel and the trend toward usage of multiple sizes of coarse aggregates.

There will also be discussion on ways to chart the course of the sand and gravel industry for the future based on the past, a discussion of a survey of gravel concrete roads in an important industrial state, an in-

vestigation of sand and gravel in bituminous mixtures by a prominent state highway department and a discussion of activities of the National Sand and Gravel Association including its engineering research program.

Subjects of joint interest to both groups will include safety and health activities, the presentation of safety awards, the proposed extent of industrial mobilization in the event of war and the extent to which producers are affected by the Federal Wage and Hour Law, the Walsh-Healey Public Contracts Act and the National Labor Relations Act.

### COMING CONVENTIONS

**National Sand and Gravel Association and National Ready Mixed Concrete Association, Hotel Jefferson, St. Louis, January 17, 18, and 19.**

**National Crushed Stone Association, Hotel Jefferson, St. Louis, January 22, 23, and 24.**

**American Road Builders and Road Show, Chicago International Amphitheatre, Chicago, January 29 to February 2.**

**National Concrete Masonry Association, National Cinder Concrete Products Association, and Cast Stone Institute, Mayflower Hotel, Washington, D. C., February 12, 13, and 14.**

**Sand-Lime Brick Association, Hotel Pennsylvania, New York City, February 12 and 13.**

**American Concrete Pipe Association, Palmer House, Chicago, February 15, 16 and 17.**

**American Concrete Institute, Palmer House, Chicago, February 27, 28 and 29.**

### Federal Wage and Hour Law

EXECUTIVE SECRETARY AHEARN sent out a letter to the members of the National Ready Mixed Concrete As-



Trophies awarded sand and gravel plants completing 1938 with best safety records

sociation relative to the interpretation of the Federal Wage and Hour Law. In it was enclosed a full copy of a statement by George A. McNulty, general counsel of the Wage and Hour division, in which he maintained that an employer who reduces wages of employees earning in excess of the minimum to avoid an increase in total labor costs due to raising wages of some employees to 30 cents an hour will violate section 18 of the Law. The law department of the National Association of Manufacturers, after analyzing the new policy stated by Mr. McNulty, has concluded that there is nothing in the law which deprives an employer of the right to establish base rates of pay for employees at any figure he is able to pay, whether such employees were on his payroll prior to October 24 or may be employed in the future, provided the base pay so fixed is not less than the absolute minimum of the Act. It is urged that the employer take all necessary steps by agreement with employees or otherwise to determine the new basic hourly rate which shall apply for the first 44 hours (now 42) and the overtime rate thereafter.

Mr. Ahearn advises that the Department of Labor has taken no action in regard to a determination of prevailing minimum wages for the ready mixed concrete industry under the Walsh-Healey Public Contracts Act.

# Hints and Helps

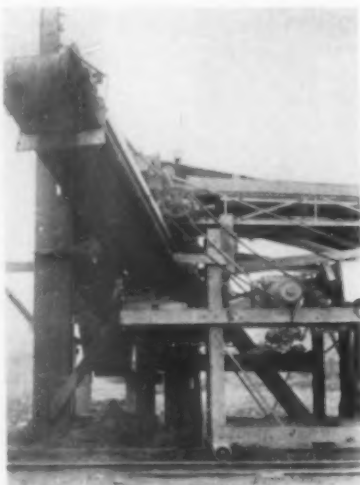
★ FOR SUPERINTENDENTS ★

## Carloader for Moulding Sand

MANLY SAND CO., Rockton, Ill., has an interesting carloader of original design at its Dousman, Wis., moulding sand plant.

As shown in the illustrations, the carloader is movable on a narrow gauge, steel rail track, at right angles to the railroad right-of-way, by means of four small flanged wheels supporting the timber framing and the conveyors, drive, and motor equipment. On top of the timber frame is mounted a short conveyor belt driven by a 3-hp. electric motor through an old automotive worm gear differential, chains and sprocket gears. The electric motor speed is reduced by this arrangement from 1200 to 400 r.p.m.

Projecting out from the end of the frame is another short conveyor which may be moved in a semi-circular arc on a turntable made from an automobile tire rim. The drive is also off the same electric motor through a chain, sprocket gear, and short vertical shaft to another automotive differential gear. To the end of one of the (axle) shafts on the differential is another sprocket gear and chain drive to the swiveling conveyor. This method of drive permits the swiveling of the conveyor while the conveyor belt continues to operate. A rod and spring tension arrangement holds the conveyor at a slightly elevated angle.



When loading a box car with sand, the carloader is pulled forward so that the inclined conveyor may be drawn into the door and swung toward one end of the car. The collecting conveyor on top of the timber frame receives sand from the plant conveyor and drops the material to the swiveling conveyor regardless of its position within the car. As the car becomes filled, the loader is pulled back on the track bringing the end of the swiveling conveyor back toward the box car door. The other end of the car is filled in a similar manner.

## Practical Pointers on the Use of Chains and Belts

By W. F. SCHAPHORST, M.E.

IN THE ACCOMPANYING SKETCH there is shown a single-ply leather belt on an ordinary shaft drive equipped with plain bearings. It is obvious that the wider the belt, the wider must be the pulley. The wider the pulley, the greater is its cost. And the wider the pulley, the greater is the lever arm "L" between the center of the pulley and the center of the bearing. The greater the lever arm or distance "L," for a given belt pull, the greater must be the shaft diameter to withstand the bending moment, as every designer knows, and the greater must be the projected area of the bearing to withstand the pressure caused by the pull through the greater leverage.

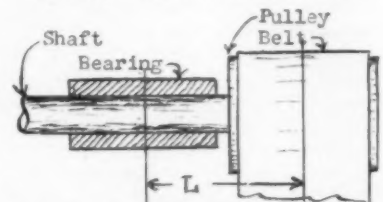
Now let us use a double-ply belt

instead of the single-ply. The total belt pull will be practically the same, but the distance "L" will decrease because of the narrower belt. Hence a smaller shaft and a smaller bearing can be used.

When V-belts are used, the distance "L" may be greater or less than with ordinary flat belts, depending upon the width of sheave selected by the designer. For transmitting the same power, V-belt sheaves are sometimes wider and sometimes narrower than ordinary pulleys.

Next, instead of plain bearings let us use ball bearings. Clearly, the distance "L" will now be reduced considerably because the ball bearing can be located close to the pulley and ball bearings are much narrower than sleeve bearings. A still smaller shaft will be the result.

Finally, instead of belts let us use

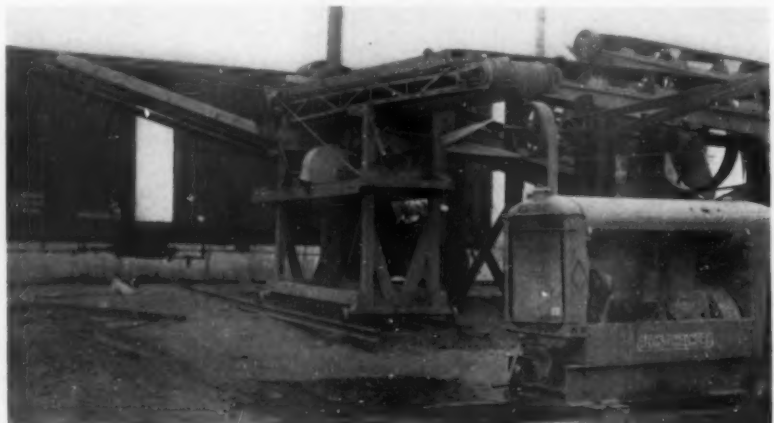


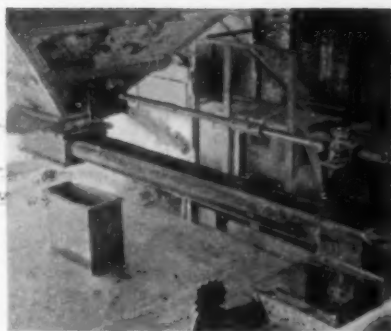
Sketch of bearing and pulley assembly to show effect of changes in design

a narrow transmission chain and ball bearings. The distance "L" will now be reduced to the very minimum because of the small resulting bending moment. A smaller ball bearing can be used, and a shaft of minimum diameter.

By attacking design problems in this way, progressively improving all conditions, it has been found in many instances that the first cost of a machine, provided with highest efficiency ball bearings and chain drive, will actually be less than would be the first cost of the same machine

Left: Short conveyor on carloader which swivels on turntable and is driven by an electric motor through chain and sprocket gears and automotive differential gears. Below: Carloader alongside plant





Arrangement of screw conveyors devised to control the feed of dry, raw material into the kilns. Left: Side view, showing 8-in. diameter pipe-enclosed conveyors below and shaft turning the agitating 12-in. screw flight above them. Center: Discharging into the kiln feed spouts. Right: Lower end of kiln feed bin showing relative positions of agitating flight above and conveyors

equipped with less efficient wide drives and sleeve bearings. In addition, the weight of the machine is less, freight costs are less, the machine occupies less space, and its all around efficiency is higher.

### Improved Kiln Feeders

A UNIQUE ARRANGEMENT of screw conveyors has been devised by the Cowell Portland Cement Co., Cowell, Calif., to feed the rotary kilns 200-mesh material from regulation hopper-type feed bins. The plant is dry process with  $7\frac{1}{2}$  x 110-ft. kilns which, until a few years ago, had been fed by a regulation U-type, covered screw conveyor directly from the bins.

Archiving in the bins, with subsequent flooding and starvation of feed to the screw conveyor greatly varied the amount of feed material carried between successive conveyor flights, and the feed into the kiln spouts was highly variable and unsatisfactory. The new feeder developed consists of a short screw conveyor flight set up in the bin just above the throat and two smaller diameter screw conveyors below it, extending into the kiln spout hopper. The twin feed screws were the first to be placed into operation, but their effectiveness did not reach maximum until "arching" in the feed bins proper was overcome.

Manually controlled air jets, electric vibrators, and air injection at regular intervals controlled by a solenoid valve were tried but proved ineffective; the vibrator failed due, principally, to heavy bin construction and cross bracing. The throat screw effectively overcame the last remaining obstacle to a satisfactory kiln feed.

The 12-in. diameter flight inside the bin functions as an agitator to insure that the other two, which are conveyors, get a constant feed, and is located, with reference to the bin

throat, where it will do most good in preventing arching. The smaller conveyors extend parallel and beneath the bin flight into a box-like extension to the bin where the feed drops into them. The compacting effect of the double flight twin screws also serves to detain air and therein



Agitating spiral flight removed from feed bin. Note perforations in the blades which aid in agitation

minimizes dusting effects of the kiln feed as it is served to the kiln.

These conveyors are 8-in. diameter, double-flight, and are encased in separate snug-fitting steel pipes instead of the ordinary channel housing with top plate. By using two conveyors of smaller diameter and closely spaced flights, the increment of feed between flights is small, tending toward a more constant discharge into the kiln spouts without any wide variance. The shaft for the 12-in. screw flight extends parallel to the others over the kiln feed spouts where all are gear-driven and synchronized with kiln speed.

### Removing Unexploded Dynamite Safely

FOURTEEN YEARS after the failure of a well drill shot, involving 16 holes, lightning struck the face of the quarry and exploded three or four of the holes that had not been detonated, killing three men and seriously injuring five others. After the explosion it was believed that all of the holes had been detonated and

that there was no further danger, but 10 years later three more unexploded holes were found.

The original well-drill shot comprised 16 holes, 6 in. in diameter, approximately 20 ft. back from the face and 16 ft. apart, and the depth varied from 72 to 78 ft.

V. M. Frey, the consulting engineer of the quarry, was called upon to devise ways of removing the unexploded dynamite. The methods considered and the final plan which was adopted were described in *Mining and Metallurgy*.

It was finally decided to undercut on a level 30 ft. below the bottoms of these holes so that the surrounding rock would be dislodged and fall into the quarry. Two 12-ft. block drill holes,  $1\frac{1}{4}$  in. in diameter, were drilled into the quarry face, practically level with the working floor. These holes were 3 ft. apart and were staggered between the well-drill holes. They were loaded with 10 sticks or 5 lb. of 40 percent quarry gelatin—a light shot.

After repeating these shots several times and removing the loose stone after each blast, the first hole was finally undercut after about four weeks, and about half of the rock from around the top of the hole was thrown down into the quarry. It was found that the dynamite in the bottom of this hole was still soft and could be readily removed with a hard wooden auger. An investigation of the two remaining holes showed that by proceeding carefully the hard dynamite on top could also be removed by this method. Scaffolds were therefore built around the tops of these holes to facilitate the work. Unloading the holes by auger was completed in six days, whereas, had it been necessary to continue the first method throughout, six to ten weeks would have been required.

An attempt to shoot misfired holes a second time is hazardous because the burden is usually less than it was formerly.

# NEWS

## ABOUT PEOPLE

RAYMOND R. WEASNER, superintendent of the Greencastle, Md., plant of Mid-West Rock Products Corp., is now superintendent of The France Stone Co. plant at North Baltimore, Ohio. Mid-West Rock Products Corp. is a subsidiary of The France Stone Co., Toledo, Ohio.

JOSEPH L. SHIELY, president and general manager of J. L. Shiely Co., and former president of the National



Joseph L. Shiely

Ready Mixed Concrete Association, has been named King Boreas VI, ruler of the 1940 edition of the nationally famous St. Paul Winter Carnival. Highlights of the carnival include a huge ice palace, a gigantic parade, and all-professional ice show, and other pageantry.

GEORGE BAUER, former assistant chief chemist of the Standard Portland Cement Co., Painesville, Ohio, is now associate research chemist with the Michigan State Highway

Department at Lansing, Mich. Before going to Painesville Mr. Bauer was with the Coplay Portland Cement Co.

HENRY F. CABELL, chairman of the Oregon State highway commission and new president of the American Association of Highway Officials was honored at a dinner December 7. Frank T. Sheets, president of the Portland Cement Association represented the American Association of Highway Officials at the dinner.

WESLEY DAVY, superintendent of the Lehigh Portland Cement Co. plant at Newcastle, Penn., spoke on "The Development of the Cement Industry," before a meeting of The Townsmen, December 6.

W. A. JOHNSON and Ned Ormes have been named directors of the Harpeth Valley Chemical Co., Franklin, Tenn., which is reported to be preparing to establish one or more phosphate plants near Franklin, Tenn.

LOUIS E. SMITH has been appointed superintendent of the Marblehead, Ohio, plant of Kelley Island Lime & Transport Co., to succeed the late I. J. Sauvey. He has been assistant to J. J. Guerin, general superintendent of the company for a year and for three months has spent much of his time at Marblehead. He formerly was superintendent of the Zanesville division of Pittsburgh Plate Glass Co., and at one time was engaged in construction work at Akron.

JOSEPH S. YOUNG, president of the Lehigh Portland Cement Co., Allentown, Penn., recently was a speaker on "The Cement Industry — Its Origin and Growth," at a dinner in Bethlehem, Penn., for members of the Northeastern Pennsylvania

(Obituaries appear on pages 113 and 131)

branch, American Newcomen Society. Others on the program included F. G. McKelvy, president, J. F. Magee, vice-president, Alpha Portland Cement Co., Easton, Penn.; and John J. Porter, president, North American Cement Corp., New York, N. Y.

B. I. WHITING has joined the Marblehead Lime Co., Chicago, Ill., as superintendent of its South Chicago plant.

GEORGE K. ENGLEHART, director of research of Valley Forge Cement Co., Catasauqua, Penn., took an active part in the sixth annual chemical engineering symposium of the American Chemical Society at the University of Michigan, December 28 and 29. He described the resourcefulness of chemistry in making available limestone hitherto considered unsuitable for cement manufacturing. The symposium was on the separation of materials in many fundamental industrial processes.

THOMAS H. MACDONALD, chief of the U. S. Bureau of Public Roads, speaking at the American Petroleum Institute's twentieth annual meeting held in Chicago recently, stated that the bureau's "surveys indicate a need for 28,000 miles of superhighways in this country, in comparatively short stretches, from centers of the cities outward. There also is a need for modernization of 60,000 miles of interregional routes which have been antiquated by the advance in travel speeds during the last 15 or 20 years."

C. C. SLIDER has succeeded his father, the late Edward T. Slider, as president of E. T. Slider, Inc., Louisville, Ky.

C. E. IRELAND, president of the Birmingham Slag Co., has been elected to the Birmingham, Ala., chamber of commerce board of directors.



Art Lofts, Sr., left, and Jr., right, owners of Lofts & Son Sand and Gravel Co., Hood River, Ore. The senior Lofts opened his first operation in 1904, taking his material from the nearby hillside, and in 1938 they built a new plant

# MACHINERY MANUFACTURERS

## Contribute Ideas

### Manufacturing Progress

By RALPH S. TORGERSON

IN REVIEWING the past year's accomplishments of the manufacturers serving the rock products industries, it is rather difficult to give special emphasis to any particular group of manufacturers or types of equipment as there have been developments in every division of manufacture. However, there are certain unmistakable trends which are outstanding.

Development of new crushers has been particularly notable. While there have been several announcements regarding improvements in primary crushers, the new secondary crushers have taken the spotlight of interest. Smaller gyratory units but with much larger capacity have been brought out by several manufacturers. The so-called impact type, an outgrowth of the soft-stone eliminator, has been introduced by three companies. Although this latter type may be used as a soft stone eliminator, it is primarily designed to serve as a secondary crusher.

Dust collection equipment, both electrical and mechanical types, has been improved to give increased efficiency and for new uses in both the cement and aggregates industries. A smaller capacity electrical type has been introduced by one manufacturer which is now being tried out by a cement company. There have been several small type dust collectors introduced to the industry for use in removing dust from mill rooms, crushers, elevators, etc.

Speed reducers of improved type have been brought out by several manufacturers for use on kilns, separators, mills, etc., where variations in speed are desired or to secure better starting characteristics.

Shovel improvements have been in the direction of lighter weight units, but with no reduction in capacity. In fact, the use of lightweight metal alloys has made it possible to substantially increase shovel capacities. Shovels have also been made more mobile by the use of an automotive

truck-shovel mounting for the small capacity units, usually  $\frac{1}{2}$  cu. yd. or less.

Further developments have been made by manufacturers in scraper and haulage units. An earth-removing unit of unusual design has huge rubber tires on the carrying and scraper chassis with smaller guide wheels in front for driving, a total of six wheels, capable of speeds up to 20 miles per hour on the highway. When stripping, the hinged scraper bottom is lowered into position, scoops up a load, and is then pulled up into position by a hoist. To provide additional power and traction required for loading, a crawler type push tractor engages the heavy steel bumper at the rear of the earth remover.

Diesel-powered units are coming into greater use throughout the industry, not only for tractive power but for individual stationary driving units.

The electric eye for kiln burning control and the electric ear to regulate the feed in mill grinding units are also developments introduced to the industry during the past year. A tube mill has been developed which both dries and grinds cement raw materials within one unit.

Perhaps the most significant trend in screens has been the efforts directed to eliminate blinding, increase capacity, and improve the efficiency of screening. One company introduced a screen with piano wire. The problem of screen wear also has been of much concern to the manufacturers.

Vibrating feeders of various types have been designed to eliminate arching and other troubles experienced in feeding relatively fine materials. The use of vibrating units also has been made to transport fine sands, cement, etc.

In the concrete products field, several new but smaller capacity vibrating machines have been placed on the market. Improvements in

concrete pipe machines involve an extension in the range of pipe sizes which may be made on packer head machines.

● ELASTIC STOP NUT CORP., Elizabeth, N. J., has introduced nine new types of nuts which embody the basic Elastic Stop self-locking element, a resilient non-metallic collar built into the head of the nut. The new types are designed as thin hexagonal, spline, internal wrenching, countersunk and counterbored one-lug anchor, countersunk and counterbored two-lug anchor, countersunk corner anchor, bracket anchor, floating right-angle anchor, and floating basket anchor.

● MACWHYTE Co., Kenosha, Wis., is now offering a wide range of sizes, flexibility and strength in Macwhyte monel metal wire ropes and Macwhyte "K" monel, "Z" Nickel, or stainless steel wire ropes. As a material for the construction of wire ropes Monel is reported to be turning in excellent records where corrosives are to be withstood, tensions sustained, and impacts absorbed. Monel is rust-proof, and where weight and space-saving are important these wire ropes are said to permit the use of smaller size cables and smaller sheaves with maximum safety as a result of their greater strength.

● UNITED ENGINEERING AND FOUNDRY Co., Pittsburgh, Penn., announces that it has been licensed to manufacture a machine which produces a new material of ordinary steel with the surface alloyed by addition of chromium and nickel and said to possess excellent wearing qualities at a cost savings of 15 to 20 percent. The material is said to increase the durability of the wearing qualities of ordinary steel at a much lower cost than ever heretofore possible. The new machine, which makes possible the production of this new composite metal, utilizes the Lincoln "Electronic Tornado" process of automatic carbon arc welding.

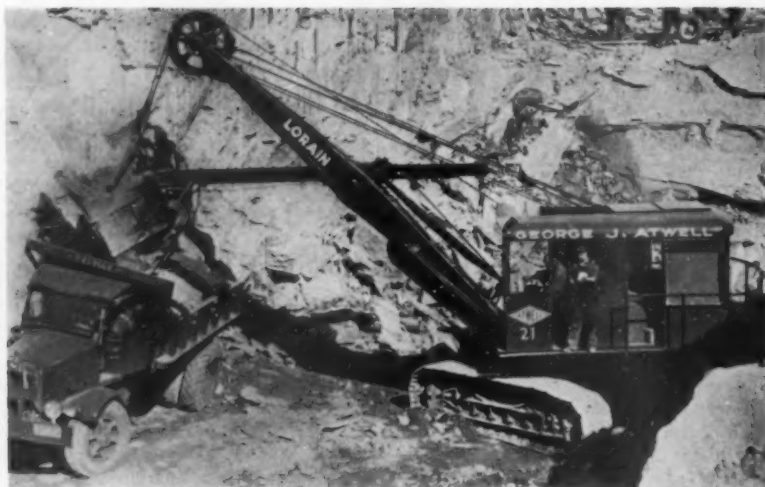
## MANUFACTURERS' Ideas



● WHEN smoke and dust in the duct exceeds a predetermined density the Photoswitch smoke control type A20C sounds a bell or light signal. In line with the trend toward precise control of operations Photoswitch Incorporated is also offering type A14B "electric eye" limit switch, a simplified photoelectric unit suitable for installation in heavy industries where exacting conditions of vibration, humidity, and high temperatures are encountered to control and limit the motion of heavy objects. Photoswitch type A14B is supplied with the light source in weather-proof housings suitable for installation in any location, and type A20C operates directly from the light given off by red hot objects. No light source is required for the latter, and the hot objects may vary in their location with respect to the control within reasonable limits

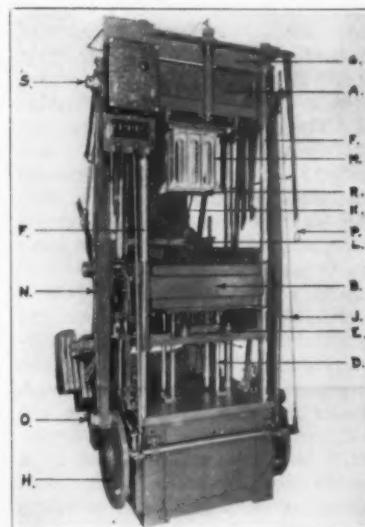


● BELOW: Double screw sand and gravel washer brought out by Eagle Iron Works is powered by a self-contained Diesel unit readily accessible for servicing yet out of the way as far as operation of the washer is concerned. The power unit is a Hercules 4-cylinder Diesel Model D400B, 3 3/4 in. bore by 4 in. stroke. The washer consists of two spiral screws each 12 ft. long, drawing the aggregates to the center of the tub and conveying them upward to the discharge end



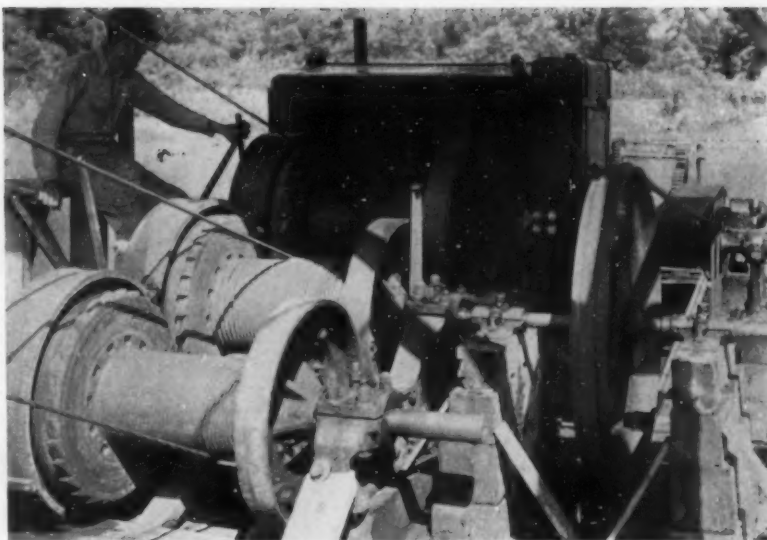
● NEW 1 1/4-cu. yd. excavator made by Thev Shovel Co., known as the Lorain-80, is available, with a complete line of interchangeable boom equipment, as a shovel, dragline, crane, clamshell and backdigger. The effective length of the shovel boom is 24-ft. 8-in., and it is equipped with an 18-ft. dipper stick. The dipper shaft is located at the center of the boom, which is claimed to yield the maximum horizontal and vertical reaches for this length of boom and stick. Among other features is complete enclosure and protection of the propelling and steering mechanism, which run in an oil bath. Pressure lubrication is provided to all shaft bearings through grease leads centralized at the front of the bed casting. Also included is an automatic crowd brake to hold the stick extended against back drift whenever the crowd lever is in neutral, and a power dipper trip which requires only a nudge of the operator's elbow to trip the dipper door

● BELOW: Front view of the Kent-Root Vibra-Press. The vibratory principle is contained within the mold box and insulated from the machine proper. With one operator and one off-bearer production will average not less than six standard block per minute on the day's run. In the illustration concrete enters through chute "K" and is guided into the floating mold box "B" by



hopper and strike-off "L." Feed is controlled by lever "P." As the mold box is being filled the cores are vibrated electrically thereby packing the concrete preliminary to the pressing operation. The rods "N" connect crank pins "O" in disc "H" and in wrist pin "S" in upper press head "A." When operator trips handle "J" crank disc "H" makes one complete revolution bringing press head "A" down for pressing action. To the lower part of "A" are attached columns "M" carrying the upper press plate "R" which reaches into the mold box in its downward stroke and does the pressing. "E" is the core supporting table, supported by columns "D" which rest upon the base of the machine. "A," "B," and "E" are mounted on four slide columns "F" extending from the base to the top head "G"

ROCK PRODUCTS



● SIMPSON Sand & Gravel Co., Valley Park, Mo., uses this HP-601 85 hp. Cummins Diesel engine to power a 6-in. dredge pump and hoists. Pumping from 30 ft., the dredge pushes material through a 500-ft. pontoon line with a 35-ft. lift to the dewatering and de-sanding plant. From here the material is conveyed by a Barber-Greene unit with 165-ft. centers to the grader, which separates it into sand, torpedo sand,  $\frac{3}{4}$ -in. and  $1\frac{1}{2}$ -in. stone. Average daily production is about 350 tons. The American Hoist and Derrick Co. winch controls the lateral travel of the boat with cables hooked to deadmen on shore, to the boom and to suction pipe travel. Recently the company has increased its capacity by changing over to an 8-in. pump. With the 6-in. pump formerly used fuel and lubrication oil costs averaged \$2.97 per day. Installation of the Diesel-powered dredge has reduced expenses \$7.93 per day and increased daily production about 50 tons



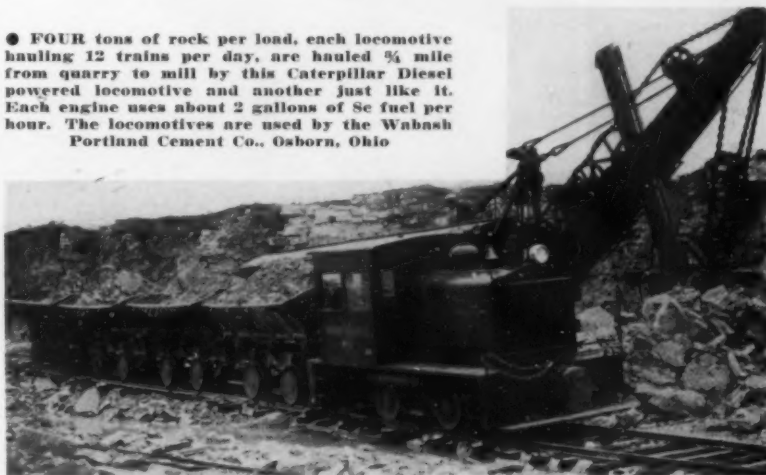
● THE purchaser of this truck, a Dart model 110, required a 10-ton capacity unit with a 120-in. wheelbase for quarry operations. To do this the engine, a Hercules model RXLD, was offset to the driver's right. As no cab was wanted, the cab protector on the dump body and the bus driver's seat forms the driver's compartment. The body was built by National Steel Products Co., and St. Paul hydraulic hoists raise it

## MANUFACTURERS' Ideas



● THIS Kochring  $3\frac{1}{2}$ -cu. ft. mobile mixer with low front and high back batch hopper is available for small operations. Known as the Kwik Mix  $3\frac{1}{2}$ -s non tilt, its outstanding feature

● FOUR tons of rock per load, each locomotive hauling 12 trains per day, are hauled  $\frac{3}{4}$  mile from quarry to mill by this Caterpillar Diesel powered locomotive and another just like it. Each engine uses about 2 gallons of 8c fuel per hour. The locomotives are used by the Wabash Portland Cement Co., Osborn, Ohio

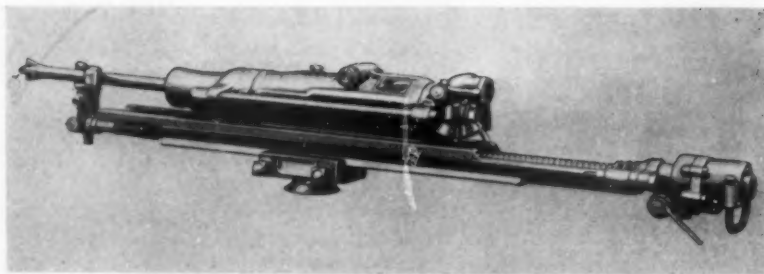


is the absence of a drum ring gear, drum drive pinion and countershaft. The drum is driven by the rubber drum rollers and is claimed to reduce noise, vibration and excessive maintenance costs. It is powered by a Wisconsin one cylinder vertical type air cooled motor

## MANUFACTURERS' *Ideas*



● ONE of the three new models of Hercules DIX two-cylinder, high-speed, heavy-duty Diesel engines and power units recently announced. Model DIXB develops 24 hp. at 1800 r.p.m. and has a maximum torque of 73 at 1300 r.p.m.; model DIXC develops 27 hp. at 1800 r.p.m. and has a maximum torque of 82 at 1300 r.p.m.; and model DIXD develops 27 hp. at 1000 r.p.m. and has a maximum torque of 92 at 1300 r.p.m. Fuel pump and governor were incorporated in the design of the cylinder block itself, and the easily replaceable fuel plungers are driven by the engine crankshaft. The flyball type governor is spring loaded and an outside control lever enables it to change the tension of the governor spring, thereby controlling the engine speed within a wide range. A large capacity gear type lubricating oil pump is located at the front end of the engine.



● HEAVY duty 100B Independent Pneumatic Tool Co. Thor drifter rock drill for drilling in mining and large tunnel work. Used with 1½-in. and 1½-in. round lugged steels, its power and strong rotation are said to give it remarkable drilling speed in the hardest formations. In addition, a constant blowing action keeps the hole clean, and for final hole cleaning a manually operated valve is easily accessible for extra blowing power. A feature of this drifter also common to all Thor rock drills is the positive, short-travel valve which controls the air admitted to the tool and allows just the amount of air to enter that is required to operate it most efficiently. Also included is the new Thor "power feed," an automatic feed that is controlled by only one hand.



● THIS large sized portable vacuum cleaner with capacity of 7½-cu. ft. has been brought out by the Spencer Turbine Co. One of its principal features is the easy method provided for raising and lowering the full dirt containers, which may weigh 700 lb. The vacuum producer has a direct connected motor operating at 3450 r.p.m. with the impellers mounted directly on the motor shaft, and the separator has seven 8-in. tubular bags with a total filter area of 39 sq. ft. Another feature is a hand shaker inside the tank making it unnecessary to rap each bag separately.



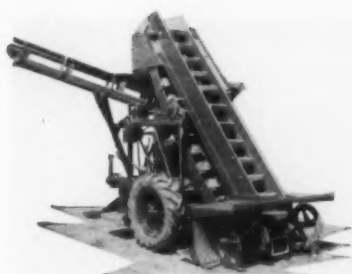
● ONE of three models of heavy-duty chain drive trucks brought out by Hug Co. They range from a gross vehicle weight of 60,000 lb. to 120,000 lb. and are equipped with bodies from 10- to 25-cu. yd.



● SHOP assembly view of large Allis-Chalmers slug mill, shipped to the Columbia Construction Co., Inc., for use in connection with sand and aggregate plant at Redding, Calif., to furnish material for Shasta Dam. This revolving machine will be used in disintegrating clay and other undesirable material, is 8-ft. in diameter, 11-ft. long and when completely assembled weighs approximately 88,000 lbs.



● BULK cement being unloaded from boxcar by the Butler "Cement Hog," a midge-sized tractor with a power-operated scoop on the front. The machine is powered by a 4 cylinder gasoline engine or electric motor and is small enough to unload without going outside the boxcar during the entire operation. One man and one laborer to clean the corners, etc., can unload a 300 bbl. boxcar of bulk cement in 1½ hr.



● ONE of the new model 522 Barber-Greene bucket loaders for loading out stockpiles. It is built as a standard machine with the usual high bucket loader boom and swivel spout and also as a low clearance machine with a short boom and swivel conveyor. A feature of the swivel conveyor discharge is said to be its simplicity which makes it possible to be used on a loader of the lowest price bracket. With the swivel conveyor, trucks can back under the discharge, or with the conveyor swung to one side, they can drive under and continue out in the same direction. Both the swivel conveyor or swivel spout machines have friction clutch and brake steering, a 19½ hp. engine, 12-in. spaced buckets and a variable speed governor. A shift in the feeding transmission makes possible a choice of two low crowding speeds

● A RECENTLY added feature of Cleveland model DR-8 drill rig or wagon drill is a recoil device close to the feed cylinder and side rod as shown below. Its purpose is to hold the machine consistently to its work without any cramping or crowding, preventing excessive "bouncing back" and a loss of energy due to possibly striking some blows while the bit is in midair. The device has increased drilling speed by 10 to 25 percent. It is featured on all new models and can be put on any DR6 machine now in the field. Illustrated is one operated in the Youngstown, Ohio district, where it averaged six 12-in. holes per hour in limestone



JANUARY, 1940

● DIFFICULTY in getting material from batching plant to mixers was overcome by use of a 75-lb. Syntron vibrator attached to the cement bin as shown to the right and a 50-lb. Syntron vibrator to the feed chutes of two cement mixers as shown below. A 75-lb. Syntron vibrator was attached to each of the three hoppers, one in front as shown in the illustration and two on the back side. The flow of materials into the weigh hopper was speeded up and arching over and plugging up of these hoppers was entirely eliminated. As illustrated below Syntron 50-lb. vibrating feeders were attached to the chute feeding the mixers. By adding this equipment flow of material through these chutes was speeded up, the tendency of the batch to hang up and dribble through was eliminated, and operation of the mixers could be speeded up. As a result the mixers were enabled to work beyond their rated capacity

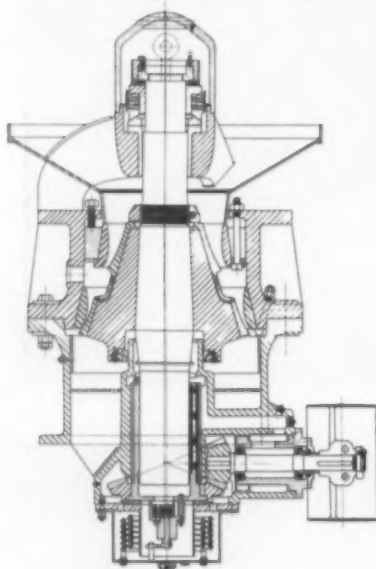
## MANUFACTURERS' Ideas



● BELOW: Part of the fleet of seven 9 cu. yd. dump trucks for service at one of the Bethlehem Steel Co. quarries. Trucks have all-welded steel bodies of Bethlehem's Mayari R corrosion resistant steel



## MANUFACTURERS' *Ideas*



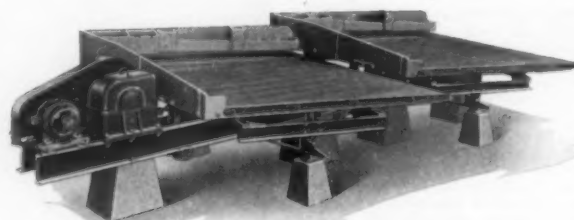
● **CROSS** sectional view of the new Traylor-Stearns multi-stage fine reduction crusher, said to be an innovation in fine crushing practice in that the upper stage, when provided with a proper feed functions as a highly efficient feeder for the lower stage, supplying it with an adequate amount of material all around its crushing bowl. At the same time the upper stage is said to accomplish about 50 percent of the crushing, thus providing a correct feed for the lower stage to operate at maximum efficiency. In general, this new crusher follows the design of the Traylor type TY reduction crusher, which it supplements. The crushing head comprises two separate manganese steel bell head mantles of different diameters, assembled one above the other with a common head center and having a suitable steel inclined spacer plate between the two. The concaves are also made of manganese steel and are of Traylor curved design and ring type, each matching its part of the composite head. A multi-stage fine reduction crusher with a 3-ft. head operates at standard speed and eccentric throw on Pennsylvania and New Jersey trap rock with a feed of through 2 1/4-in. on 3/4-in. discharged through the lower stage and 54 tons per hour of 3/16-in. to 72 tons per hour of 9/16-in. material

● **EXCAVATING** quarry wash from settling pond at Bethlehem Steel Co., with a Ray City model 18, 3/4-cu. yd. 16 1/2-ton truck crane mounted on a White truck. The heavy consistency of the material handled results from refining limestone for use in blast furnaces



● **THIS** latest type Jaeger truck mixer is driven directly from a Ford truck engine through Jaeger shock-proof transmission, operated by vacuum control on the steering post. Such an arrangement is said to be made possible by the ample reserve power of present day truck engines for driving a mixer drum, thus eliminating the expense, weight and upkeep of a separate engine. Any standard type of power take-off may be used. Vacuum operation of the multiple disc type mixer transmission is said to be absolutely fool-proof and safe and easy in traffic, as the touch of a lever on the steering post automatically and smoothly stops or starts drum

● **MORE** and more sand and gravel operators are becoming interested in equipment for removal of contaminants to enable them to meet stringent highway specifications. The Deister Concenco Duplex washing table shown below is driven by the new Concenco anti-friction bearing head motion shown at the left, which is primarily designed for heavy duty service. It is said to feature greater "kick," insuring handling of larger tonnages, and tests have shown it to require somewhat less power to run. The toggle featured in this unit is maintained in contact with its co-parts by the spring tension, the arc through which the lower end of the toggle moves determining the length of the stroke produced by the head motion



**ROCK PRODUCTS**

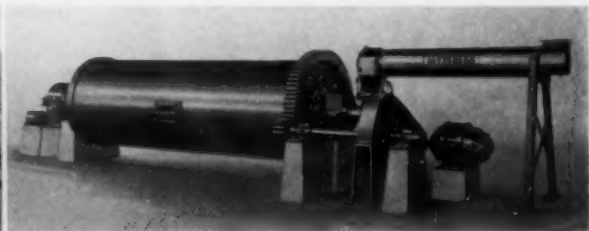


## MANUFACTURERS' *Ideas*

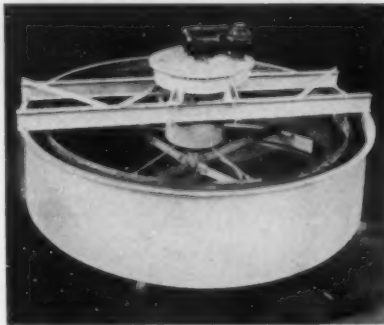
● **LEFT:** Pioneer Vibrator-Duplex portable crushing plant now has a screening arrangement for producing rock chips as a by-product simultaneously while producing road gravel and rejecting sand. The bottom deck screens pit run material only and the top deck screens crushed material, making it possible to screen out 100 percent crusher chips on the top deck



● **ABOVE:** Two-way side-dump trailer for hauling rock from quarry. The trailer units are 12-cu. yd. Gar Wood bodies equipped with Gar Wood end mounted hoists capable of dumping on either side, and the hauling unit is an Autocar Diesel. This is typical of the units used by Marquette Cement Manufacturing Co.

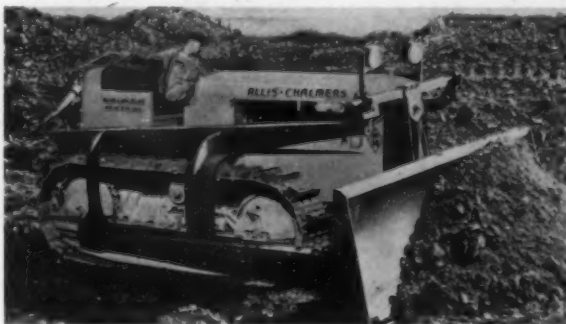


● **ABOVE:** To meet market demands for high grade calcium carbonate used in paper coatings, pigments, pharmaceuticals and other products calling for rigid specifications, a refining process embodying this Patterson tube mill has been developed and is being used by a lime producer. Lime is precipitated to sub-micron size, then washed, run through a continuous dryer and, while still hot, is fed to the Patterson tube mill through a pre-cooler, at the right in the illustration. The result is said to be a dry, light and fluffy product of fine particle shape ready to ship without further separation



● **IMPROVED** Hardinge hydro-classifier embodies a geared head motor mounted in driving head on cast iron housing. The use of a spur gear drive is said to add strength to the mechanism and permit forcing the scraper through heavy solids which might pack in the bottom of the tank. Sand, or oversize, in the classifier is delivered through a central opening in the bottom of the tank surrounded by a whirling vortex of water

● **BELOW:** The first of a new line of Allis-Chalmers crawler tractors powered by six cylinder General Motors Diesel engines. Called the HD14 it develops 130 hp. on the belt, 106 hp. on the drawbar and weighs 27,000 lb. The transmission with six forward speeds and two reverse provides forward speeds from 1.72 to 7.00 m.p.h. and reverse speeds of 2.00 and 3.20 m.p.h. Other features include the use of the new "Positive Seal" truck wheels, which are said to require lubrication only once every 200 hours. Steering clutches and brakes of a bi-metallic material are used. This engine also makes possible throttle control of a tractor, giving a range of speeds in any gear down to half rated engine speed, without loss of drawbar pull



● **BELOW:** Operating two rock drills with new Sullivan Zeph-Air portable air compressor. Mounted on a two-wheel trailer this unit can be towed by pleasure car or truck at any reasonable traffic speed. It is available in two sizes with actual air deliveries of 60 and 85 cu. ft. per minute for pressures up to 125 lb. per sq. in., and is powered by a heavy duty, gasoline power unit with force-feed lubrication

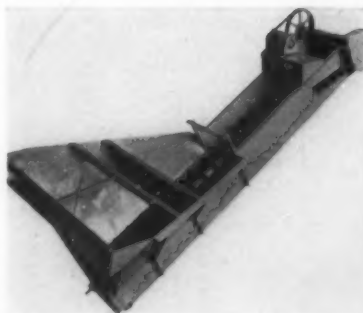
## MANUFACTURERS' *Ideas*



● ABRASIVE materials are reduced by impact without attrition by this new Pennsylvania Reversible Impactor. Product of the Impactor contains a high percentage of cubical particles of the desired size and a surprisingly low percentage of extreme fines. The feed is dropped from a sufficient height so that the faces of the impactors drive it against adjustable anvil assemblies, in alternate right and left-hand operation, for repeated double impact crushing and open bottom discharge. Attrition is thus almost completely avoided; consequently wear, maintenance and power are said to be substantially reduced, while the particle form is said to be superior to that obtained from pressure types. On some materials, the Impactor operates at such a wide reduction ratio that two-stage crushing, formerly required, is no longer necessary. Pennsylvania Impactors are now available in six sizes in capacities ranging from 10 to 500 tons hourly



● THIS exceptionally small screen, the Robins Style J 1.3- x 3-ft., Vibrex Screen, can screen an average maximum capacity of approximately 30 tons of 1½-in. crushed rock in an eight hour day. Of the suspended type, it has two screening decks which separate three products. It is designed primarily for temporary and portable operations and also for use in small plants making precast concrete units

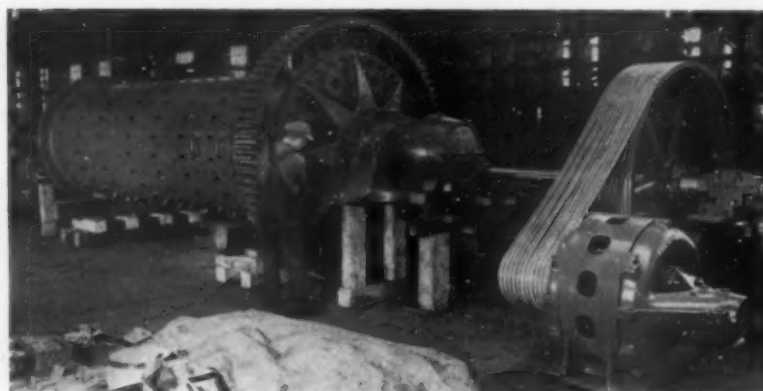


● SAND classifier developed by Smith Engineering Works has the same service applications as the Teismith sand drag—dewatering, rewashing and classifying sand. Made in single and double screw types with sand capacities from 10 to 60 cu. yd. per hr., it features a quickly adjusted control to regulate water overflow velocity and size of finished product

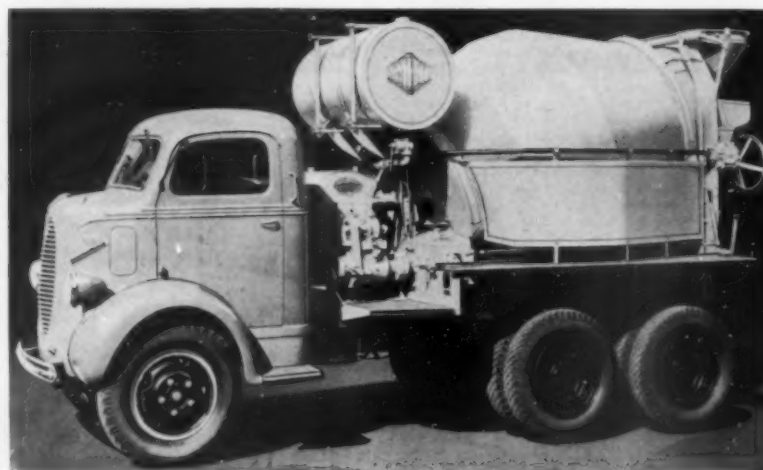
● MAIN frames and shovel booms on this Byers ¾-cu. yd. shovel are of oxy-graph torch cut, die formed and electrically welded, rolled steel plates of thicknesses up to 2½-in. The shovel is either gas or Diesel powered with



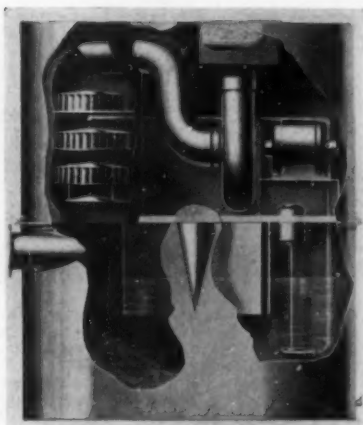
chain or cable crowd optional. All major shafts and friction clutch discs are carried by ball and roller bearings. Other features include two speed crawler, electric starter and mechanical dipper trip and self-cleaning trends



● GRINDING trap rock requires equipment designed for the purpose. The shop view shows a 5- x 18-ft. Allis-Chalmers ball peb mill complete with feeder, 150-hp. motor and Texrope drive; to be installed at Grent Notch Corp, Great Notch, N. J.



● NEW 3-cu. yd. Smith-Mobile truck mixer and agitator, to be exhibited at the Chicago Road Show for the first time. A large feed chute takes the place of the conventional loading hatch, and during the charging operation the drum revolves so that shrinking and mixing start as soon as materials enter the drum



● **CUT-AWAY** diagram of the new Schnellle midget multi-wash dust collector for dust and fumes arising from isolated operations or equipment that cannot economically be tied into a central dust collecting system. Made in six small sizes with a range of from 300 to 1500 c.f.m., it is completely self-contained and ready to plug into electric outlets. Fouled air is drawn into the miniature scrubbing tower where it is scrubbed out by spray walls and becomes impinged on a multiplicity of curved wet vanes arranged in several tiers. Impinged matter is washed down to a sludge chamber by the turbulent action of water introduced above the impingers. The washed air next passes through an entrainment separator to remove excess moisture and is then delivered to the plant atmosphere, passing through a metal-wool diffuser and sound deadener as it leaves the unit

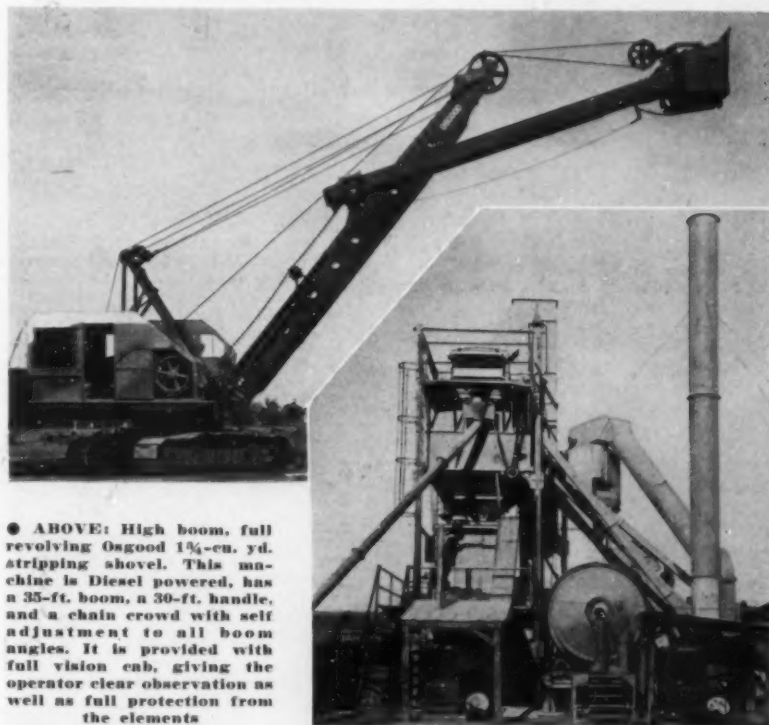


## MANUFACTURERS' Ideas



● **ROCK** crusher plate reconditioned by welding 1-in. round bars of 11-14 percent manganese to the plate and applying weld metal to build up the worn edge of the casting. Arc welding with Lincoln "Manganweld" electrodes and welders saved 24 percent of replacement cost and produced a part which lasts twice as long as the original

● **ABOVE:** New type of carrier for slackline operation on a Sauerman 3-cu. yd. Crescent scraper bucket. The carriers are of two- and four-wheel design, have cast steel housings, alloy heat-treated sheaves, and in certain sizes are equipped with roller bearings. The development of remote control systems for Sauerman scraper and cableway hoists has been carried further during the last year, with the result that four different systems of operating scraper or cableway hoists are now available



● **ABOVE:** High boom, full revolving Osgood 1 1/2-cu. yd. stripping shovel. This machine is Diesel powered, has a 35-ft. boom, a 30-ft. handle, and a chain crowd with self adjustment to all boom angles. It is provided with full vision cab, giving the operator clear observation as well as full protection from the elements



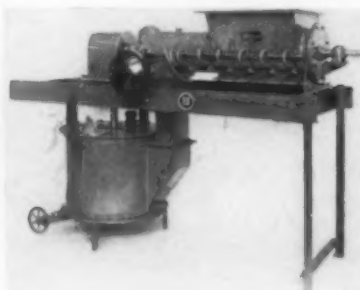
● **LEFT:** Aggregate producers seeking new profitable outlets are not overlooking the market in road mix plants. To the left is a Simplicity portable asphalt mixing plant of 75 tons per hr. capacity powered by two International Diesels. Within one season this plant has seen service on three different jobs, involving two complete dismantlings, loadings, shippings, and erections. The Simplicity 15-ft. double-shelled dryer is easily mounted and separate furnace sections keep units small enough to be handled with ease. The power assembly is raised into position with a minimum of difficulty, screens and storage are lifted into place by means of four Beebe hoists, mixing and weighing assembly follow, and all are bolted to two sets of knees

## MANUFACTURERS' *Ideas*



● **MOBILE**, self-propelled crusher made by Rogers Iron Works Co. is available with jaw openings ranging from 144 to 200 sq. in. powered by gasoline or Diesel engine. Among the improvements recently made are one-third weight reduction and shorter turning radius

● **UNIFORM** rate of feed to the kiln is insured and flushing is said to be completely prevented by this Smidth Ex-Or Feeder, which is a pneumatic feeding device for feeding such materials as dry raw mix



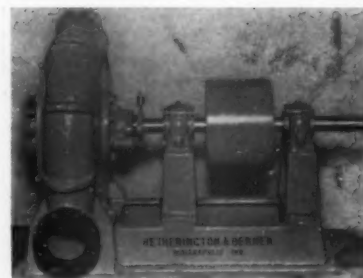
● **BELOW**: Mobile truck-shovel of  $\frac{1}{2}$  cu. yd. capacity introduced by Michigan Power Shovel Co. has dual tandem-drive traction and is said to be easily convertible from shovel to crane, drag-line, clam or trench hoe. A special chassis design permits a very low center of gravity for balance and finger-tip air controls operate the shovel which swings in a full circle



● **ONE** of the ball mills manufactured by F. L. Smidth & Co. for installation in a new cement plant. It has a tire arranged for trunnion support at one end and a slide shoe bearing at the tire without a trunnion at the other end



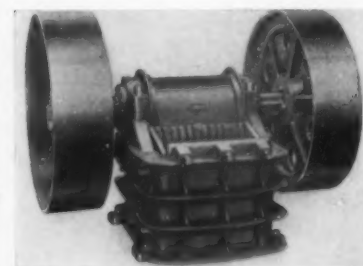
● **ANOTHER** interesting development of F. L. Smidth & Co. is the Unidan mill shipped to a new West Coast cement plant. The mill, which is used for dry grinding, is of particular interest because it is of welded construction



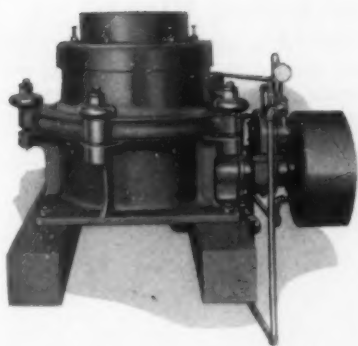
● **ANTI-FRICTION** bearings on sand and gravel pumps are made possible in the new Hetherington & Berner roller bearing pump. It features accessible mounted bearings of standard design enabling the operator to change the shaft or bearings with a minimum of trouble



● **FORD** truck re-engineered with Marmon-Herrington all-wheel drive ready for action. This is one of the thirty models of Marmon-Herrington all-wheel drive trucks and trailer tractors ranging in size up to 25 ton load capacity for trucks and up to 50 tons or more for tractors. Hercules gasoline and Diesel engines are used for motive power in addition to all standard Ford truck motors



● **NEW 10- x 24-in.** jaw crusher developed by Diamond Iron Works, Inc., has oversize heavy duty roller bearings in pitman and journal boxes with extra heavy forged alloy steel heat treated eccentric shaft. The extra pitman allows the use of long manganese jaw plates with graduated contour that is said to give positive breaker grip and rapid passage of reduced product



● **TELSMITH** Intercone crusher for secondary and fine crushing to produce  $\frac{1}{2}$ - to  $\frac{3}{4}$ -in. material. It is a high-speed crusher with a conical head gyrating horizontally within an outwardly flaring curved concave bowl. Material crushed in the upper zone automatically spreads over a greater area as it moves downwardly, between crushing strokes, through the lower crushing zone to the discharge opening

● **THIS** combination trailer and tractor has been especially designed for level quarry operations. It is powered with a model EG Mack tractor, a unit of 132 $\frac{1}{2}$ -in. wheelbase having a 3 $\frac{3}{4}$  x 4 $\frac{1}{2}$ -in. engine, and has a smaller engine than would be used for a similar gross on a road unit. The trailer unit is a 9 $\frac{1}{2}$ -cu. yd. side dump Easton body of Phoenix type. No integral hoist is used, the body being tipped by a lift installed at the unloading point

## MANUFACTURERS' Ideas



● **SAND** dredge buckets are subject to considerable abrasion wear. Above and to the right are shown sand dredge buckets on the Warner Co. dredge "Viking" which were made of cast manganese steel by Taylor-Wharton Iron and Steel Co., to a design prepared in collaboration with Warner engineers



● **BELOW:** Several improvements have been made in this  $\frac{3}{4}$ -cu. yd. Marion excavator. Among these are a tubular, all-welded steel boom, anti-friction bearings at each important point, cone type rotating clutches controlled by a single lever, and chain crowd for positive control and easy boom adjustment

● **BELOW:** Moving gravel from box car to bin with a P&H Model 355 crawler-mounted clamshell, powered by a gasoline engine. It uses 3 gal. of gas per hour and handles over 500 cu. yd. of dirt, sand or gravel in an 8-hr. day



● **"UNIVIBE"** vibratory riddle developed by Universal Vibrating Screen Co., Racine, Wis. Weighing but 39 lbs., it operates from any light socket either as illustrated, on a small stand, or suspended. The screen is said to operate at a cost of one-tenth of a cent per hour and employ a new principle in keeping the mesh free from blinding



# MANUFACTURERS' *Ideas*

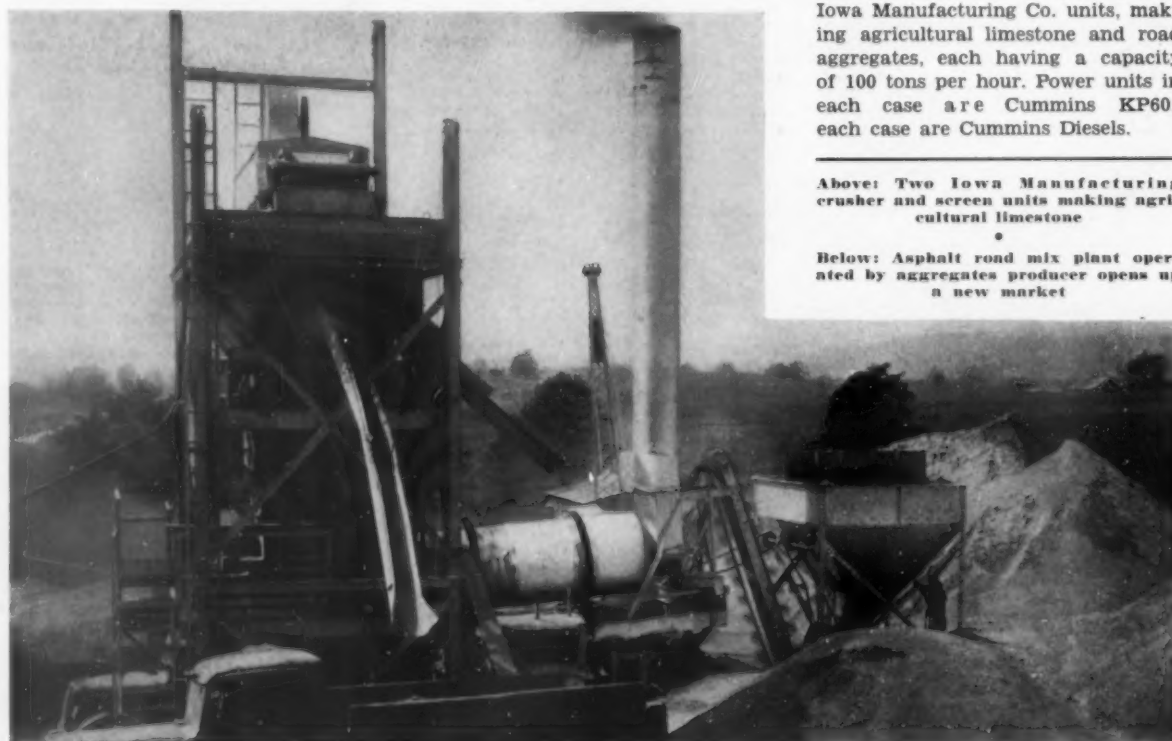
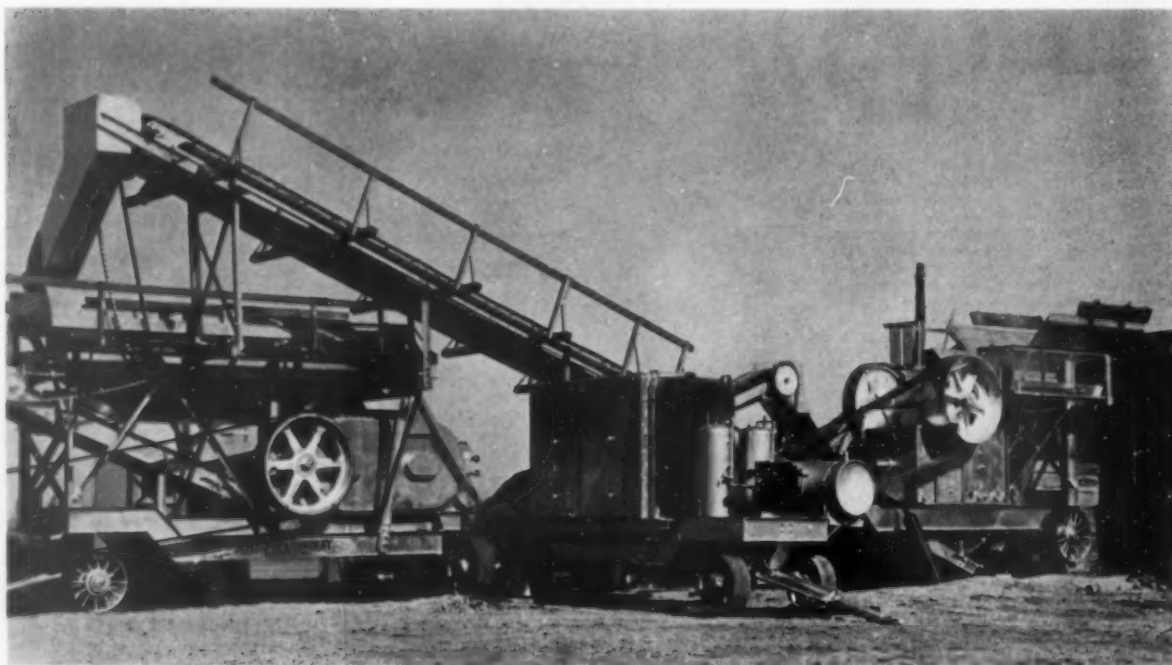
## Portable Road Construction Plants

● WHERE SECONDARY ROADS are being built, it is sometimes desirable to utilize portable units near the construction.

One of the views shows an asphalt road mix plant, including hopper,

(cold) elevator, Iowa Manufacturing Co. drier, double deck Symons screen, steam-jacketed pug mill, aggregate batcher, (hot) elevator, and two 60-hp. Allis-Chalmers gas engines.

The other view is of a portable



plant operated by Churchill Gravel Co., Pontiac, Ill., comprising two Iowa Manufacturing Co. units, making agricultural limestone and road aggregates, each having a capacity of 100 tons per hour. Power units in each case are Cummins KP601 each case are Cummins Diesels.

Above: Two Iowa Manufacturing crusher and screen units making agricultural limestone

Below: Asphalt road mix plant operated by aggregates producer opens up a new market

# Friend and Collaborator

IT IS OUR SAD DUTY to notify his host of friends in the rock products industry of the death December 11 in Los Angeles, Calif., of Edmund Shaw. No more genial and generous man ever loved and served these industries or more deserved the friends he made. For the past several years he had retired to a modest little home in southern California, but his pen was never idle, and within the last year he was enthusiastically engaged in rewriting a series of articles on his favorite subject—the classification of commercial sand. This series, now running in current issues of *ROCK PRODUCTS*, was practically completed, and publication will continue through 1940.

Ed Shaw was of old New England stock, born in Rockland, Mass., June 11, 1870. He studied mining engineering at Massachusetts Institute of Technology but left school in his junior year to accept a position at the Homestake gold mine in the Dakotas. There he got his first practical experience in a variety of mining problems. While working there he was married.

Some time later he went to El Paso, Tex., which for many years was his family's home. This family included four sons and a daughter, all of whom survive him. His wife died five years ago in Los Angeles. Much of Ed Shaw's life during these years was spent in Mexico and Central America on various mining projects, and he came to speak Spanish fluently and to be much at home among the natives, of whom he was very fond. Being ever philosophically minded he was at home and happy under any and all conditions, so long as there was human companionship to share.

It was during his residence in El Paso that he became associated with Charles Allen of the Allen Cone Co. For a number of years he was a sales and service engineer for the Allen Cone Co., and in this way first got acquainted with the rock products industry. He made the first Allen cone installations in the Tennessee rock phosphate field.

About 1921 he came to Chicago and announced his intention of establishing himself as a consulting engineer to serve the rock products industry. It was then I made his acquaintance and there began a friendship which has ended only in his death. We, of *ROCK PRODUCTS*, helped get him ac-

quainted with our industries and with the men who directed them. He early saw the approaching problems to be met with in sand classification and recovery, and predicted the time would come when producers would be called upon to make, what he termed "prescription" sand. That time was much longer coming than we anticipated, but he lived to see his prediction come true.

Ed Shaw was too kind hearted and easy going to make a success of an



Edmund Shaw

individual business. He was so ready and willing to give advice by his very nature that making even a very modest charge for it was unnatural and distasteful. He had already shown his ability to write clearly and helpfully about sand and gravel production problems, so after about a year as a consulting engineer, he gave up his practice and joined *ROCK PRODUCTS* as my co-editor. There, at last, he was in his element. He once told me his secret ambition had always been to be an editor. He loved it and the contacts and the friends he made. He traveled yearly from one end of the country to the other. And when he was at home in charge of the "works," I always knew *ROCK PRODUCTS* traditions and service and quality would be maintained even

better if anything than when I was there. And that gave me opportunity to travel extensively, too.

Ed Shaw left *ROCK PRODUCTS'* active service about ten years ago, after a partial stroke, so that he could take life easier in a sunnier clime. However, he never did lose interest in *ROCK PRODUCTS* and its editor, he frequently contributed special articles and current news, and served for a number of years as our West Coast editor. Thanks to the splendid work he did for *ROCK PRODUCTS* and his wide knowledge and experience and literary ability, articles from his pen are found cited in numerous textbooks and permanent literature of the industry. His first series of articles on sand settling and classification, published in 1922-23 were reprinted in book form and constitute an industry classic; long ago the supply was exhausted.

Ed Shaw had the unique distinction of being the only *honorary member* ever elected to the National Sand and Gravel Association.

NATHAN C. ROCKWOOD

## Other Obituaries

JOSEPH H. WALTON, mechanical engineer of the Southwestern Portland Cement Co. plant at Victorville, Calif., died November 16 at the age of 64.

PAUL C. HODGES, vice-president of Marble Cliff Quarries Co., Columbus, Ohio, died December 7 at the age of 61. He became associated with Marble Cliff as traffic manager following resignation as manager of the Norfolk & Western Railroad's Toledo office and became vice-president of the firm in 1929. Among his other activities he was chairman of the Community Fund in 1925, chairman since its organization of the transportation committee of the Columbus Chamber of Commerce, member of the Chamber board from 1930 to 1937 and vice-president in 1933 and 1934. He also held offices in the Ohio Valley transportation advisory board and the Manufacturers and Wholesalers Association.

GEORGE F. SCHLESINGER, chief engineer and secretary of the National Paving Brick Association, died December 1. He was 55 years of age. Mr. Schlesinger was well known in engineering and roadbuilding circles throughout the nation and since September, 1938, had served as treasurer of the American Road Builders' Association.

(Obituaries also appear on page 131)

# PLAN NOW } 1940 CONCRETE TO ATTEND } INDUSTRIES THESE BIG } CONVENTIONS EVENTS !!! }

## **National Concrete Masonry Association**

★ Washington, D. C.—February 12, 13 and 14  
Mayflower Hotel

One of the most important years in the history of the concrete masonry industry will be reviewed, and curtains will be drawn back for a view into the future. An outstanding program is promised.

... plus a trip to Florida, one of the most active markets for concrete masonry in the country, immediately after the convention. Many of your friends are planning to make this trip.

## **Cast Stone Institute**

★ Washington, D. C.—February 12 and 13  
Mayflower Hotel

Important plans are being formulated to make this one of the most important meetings in the history of the Institute. All manufacturers will find this a notable event.

## **American Concrete Pipe Association**

★ Chicago, Ill.—February 15, 16 and 17  
Palmer House

A program of outstanding value is promised for this meeting. The informal discussions of these meetings make them of exceptional and practical value.

## **American Concrete Institute**

★ Chicago, Ill.—February 27, 28 and 29  
Palmer House

A meeting place for concrete technicians, where fundamental problems are studied to improve current practices.



Join with others in the Concrete World as they get together to learn and to plan for future profits. Every event will be a real education.

**DON'T  
MISS  
THIS**

## **FEBRUARY ISSUE FEATURES**

1. Pictorial Review of New Concrete Products Equipment for 1940.
2. Preview of Concrete Industries Conventions.
3. Extra Distribution to All Producers Attending.

# CONCRETE PRODUCTS AND CEMENT PRODUCTS

## "The Californian" Sells the Concrete House

Demonstration home built by Basalt Rock Co. and  
displayed at San Francisco's Golden Gate  
Exposition, attracted visitors from Coast to Coast.



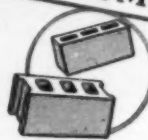
# A PERSONAL LETTER TO YOU

from J. H. BESSER, President  
Besser Manufacturing Co.  
Alpena, Mich.

## BESSER MANUFACTURING COMPANY



MANUFACTURERS OF  
**BESSER  
CONCRETE  
MACHINERY**  
COMPLETE EQUIPMENT FOR  
CONCRETE PRODUCTS PLANTS



ALPENA - MICHIGAN

To the Concrete Products Industry:

During the past year many important advancements have been made in Besser concrete block machines, both tamping and vibrating. This is in keeping with the Besser record of bringing out improvements which have maintained their leadership in the industry, attained with the introduction of Plain Pallet Strippers with their extremely simple construction and automatic operation.

The importance and value of the Plain Pallet principle has been demonstrated as never before during the past year by applying it to vibrating as well as tamping machines. This gives the advantages of Plain Pallet economy to all whether they prefer tamped or vibrated blocks.

Further new developments have been made in connection with the Besser Vibrapac machine which makes either a dense, moisture and "smoke proof" block, or a porous block, as desired for outside or inside walls. Vibration is no longer confined to the manufacture of open textured units, but as applied on the Vibrapac will make either porous or dense units.

The Besser Manufacturing Company cordially invites you to attend the National Concrete Masonry Association Convention to be held at Mayflower Hotel, Washington, D. C., February 12, 13 and 14, 1940. There you can see moving pictures of Besser Tampers and Vibrators making FULLY PRESSED TOP blocks--blocks with strong sales appeal and of a quality that will command the respect of architects and builders. Specimen blocks will be available for examination and any tests you care to make.

There will be no machinery exhibit this year. However, there are Besser equipped plants in and near Washington available for inspection where you can see being made the quality blocks you want to make on either Tampers or Vibrators.

We will look forward with pleasure to seeing you at the Convention.

Sincerely yours,

*J. H. Besser*  
J. H. Besser, President  
Besser Manufacturing Company

# Fair Boosts Concrete House

**Build up large list of active prospects for new homes from crowds attracted to San Francisco Exhibit**

**By BROR NORDBERG**

**S**AN FRANCISCO'S Golden Gate International Exposition afforded a splendid opportunity for the Basalt Rock Co., Inc., Napa, Calif., and northern California cement manufacturers to demonstrate concrete products as a residential building material.

It will be remembered that the Basalt Rock Co. had made a considerable investment in 1937 for a concrete products plant (Rock Products, February, 1938, pp. 63-65), and some outsiders had expressed doubt as to the wisdom of the enterprise, but the company is backing up the investment by capitalizing on its opportunities and is doing a real job of sales promotion.

Quite a volume of business had been built up prior to the opening of the Exposition's Homes and Gardens Court, but this exhibit gave the company a chance to create public appeal and to dramatize its products. "The Californian" was the name chosen for a typical rambling ranch-type house built by Basalt Rock Co. with the cooperation of the San Francisco office of the Portland Cement Association. This type of house is a favorite among Cali-

fornians, the combination of name and design creating a strong desire among Fair-goers to investigate further.

"The Californian" which is in the style of the State's early architecture, has five rooms without a second story or basement, a two-car garage, a service porch and patio, presenting a most pleasing and livable effect. Workmanship was stressed in laying up the walls, and close attention was given to construction details that too often are carelessly done by masons.

"Basalite" concrete units are used throughout for the principal construction. The name "Basalite" was selected from the start as the company's trade mark, in keeping with good merchandising principles, to make these units stand out distinctly in contrast to "blocks" the commonly used term. Within a year "Basalite" has been so impressed on the public mind that "The Californian" has often been referred to as the "basalite" house by Mr. Average Citizen.

Concrete units in the exhibit home are all made from pumice, a light-

weight aggregate that provides all the desired properties such as nailability, insulation, good acoustical properties, etc. A cubic foot of this concrete actually weighs only 60 to



Sign on the walk at San Francisco's Fair advertising The Californian, the only concrete masonry house on exhibit

65 lb., using a combination of jolting and tamping to pack it into the molds.

## Methods of Reinforcing

Flexibility of these units in meeting California's rigid earthquake specifications and architectural requirements was emphasized in the home by varying their application. A portion of the exterior wall was left exposed and the rest was finished with reinforced concrete stucco having reinforced cement plaster on the inside. These methods of reinforcing surfacing coatings integral with concrete units are very recent developments of the Basalt Rock Co. to permit the use of thinner wall sections.

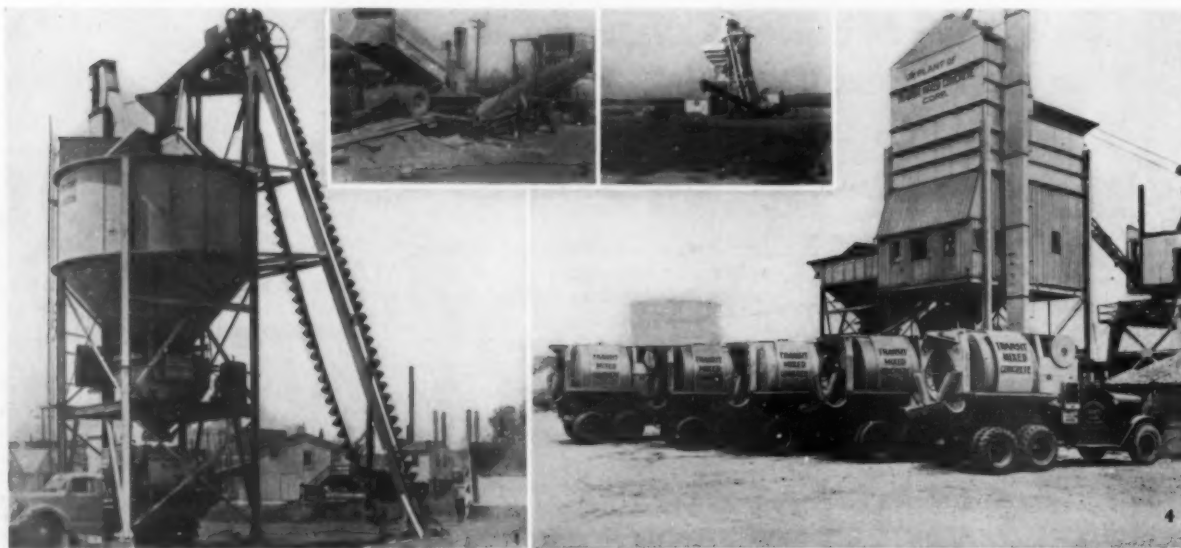
After the walls are laid up, 1- x 1-in. mesh welded steel fabric is nailed onto the units over the entire area, and a ½-in. thickness of cement stucco uniformly applied. According to test data, the fabric reinforcing, of 18-gauge wire, gives surface strength to the stucco-concrete system to resist tension applied to the wall by high winds or other outside disturbances. Similarly, 7-in. welded steel mesh is nailed to the interior of the concrete wall and ½ in. of cement plaster applied. This

(Continued on page 120)



Attractive exterior of The Californian, typifies early Spanish architecture

## TRENDS IN READY-MIXED CONCRETE



**W**AYS of batching and handling materials for ready-mixed concrete are developing rapidly with the growth of the industry. Fig. 1 shows a modern one-man-operated, Blaw-Knox plant owned by Consumers Supply Co., Louisville, Ky. This plant has an 18-ft. diameter compartment bin, receiving aggregates in trucks and cement in hopper-bottomed cars, and uses a single 2½-cu. yd. batcher. Many of the larger plants are being built with automatic devices, such as the electric eye, for accuracy.

Illustrations, Figs. 2 and 3, show how Ready-Mixed Concrete Co., Denver, Colo., handles large contracts in outlying districts. One shows a Blaw-Knox semi-portable plant erected at the job site, receiving cement in a special bulk cement truck from a

central plant on a railroad. The other is of a 24-in. by 39-ft. Barber-Greene transfer conveyor for charging dry-batched aggregates into truck mixers near the job. Using this device, a 60 cu. yd. output per hour is maintained as far as 10 miles from the plant.

This concern pioneered ready-mixed concrete in Denver, for the larger projects, and successively added two semi-portable plants and then the transfer conveyor to keep haulage mileage down and yardage up. One of the plants is now located at Lowry field, U. S. Army, to furnish 16,000 cu. yd. of concrete.

Illustration No. 4 is of a modern batching plant and fleet of trucks with Ransome transit mixers operated at Richmond, Va., by Transit Mixed Concrete Corp. It is typical

of today's service facilities for handling concrete.

Below are two views of one of the largest commercial cement batch and aggregates retail plants in the country operated by Hunkins-Willis Lime and Cement Co. of St. Louis, Mo. It's a good illustration of facilities used for the distribution of materials from a centralized location in or close to a large metropolitan area. The plant, built by Alpha Tank and Sheet Metal Manufacturing Co. in cooperation with Everett Hunkins, has a storage capacity for 750 tons of aggregates and 1200 bbl. of cement. Both are received by rail. Batching out capacity for aggregates is 300 tons per hour, using three weigh lorries and air-operated bin gates. One illustration shows the cement weigh



## NEW PRODUCTS and EQUIPMENT



**S**ALES of concrete masonry were up about 25 percent in 1939 and the industry was particularly active in increasing and modernizing its productive facilities.

Some new products have been developed. The first illustration is of a Besser "Vibrapac" plain pallet stripper in the plant of Bethayres Concrete Products Co., Bethayres, Penn. This is a vibrating machine with an output of 5000 standard blocks a day.

Mahlstedt Materials Co., New Rochelle, N. Y., early in 1939 received a large order for precast concrete paving block. The second illustration shows them being laid in the 178th

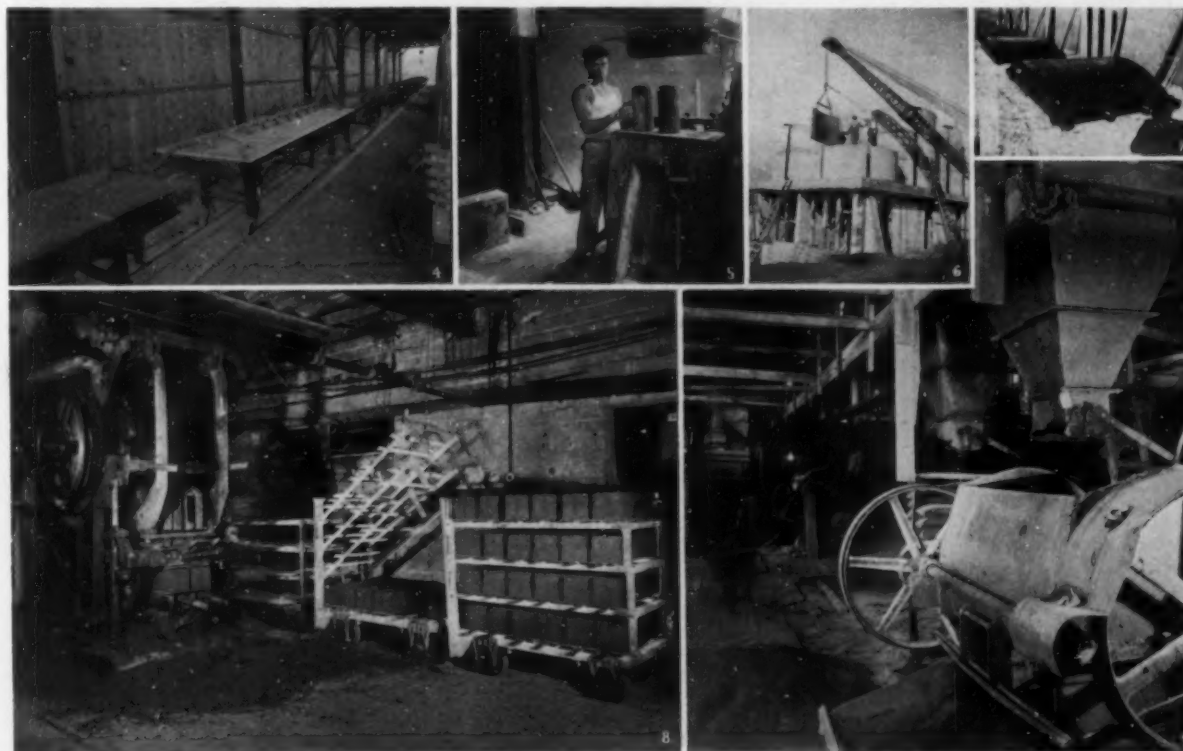
Street vehicular tunnel approach to the New York end of the George Washington bridge.

The third illustration shows how concrete brick made on a Jackson and Church rotary brick press are handled on cars into the high pressure steam curing cylinders in the plant of Saginaw Brick Co., Saginaw, Mich.

Fig. 4 shows the practical application of the suction process of curing in a West Coast concrete products plant. The process, developed by Vacuum Concrete Corp., is here extracting excess water from special building blocks immediately after they were poured. Porous concrete

drain tile and the compression-stripper machine on which they are made by Berks Products Corp., Reading, Penn., are shown in No. 5. Made in 4- and 6-in. diameters, one foot long, of graded limestone screenings, the Pennsylvania Highway Department is using them for highway drainage.

Illustrations Nos. 6 and 7 show the molds for making special segments for silos and the laying up of a storage silo for a sand and gravel plant. Batching and mixing equipment and hinged-deck Chase Foundry and Mfg. Co. transfer cars in the plant of Edmonds Art Stone Co. are shown in illustrations Nos. 8 and 9.



## "The Californian"

(Continued from page 117)

internal system of reinforcing has FHA approval, and the exterior reinforcing has been submitted for approval.

These two systems were applied, for exhibit purposes, to all exterior walls except the living room. Living room walls were of 4- x 16-in. units 8-in. thick, reinforced internally by

laid up with "basalite" cambered shingle tile in an attractive, dark gray textured to resemble the appearance of grained wood. Shingles made on the company's English machine are nearly flat,  $\frac{1}{2}$  to  $\frac{3}{8}$  in. thick,  $6\frac{1}{2}$  in. wide and  $12\frac{1}{2}$  in. long with a camber of  $\frac{1}{4}$ - or  $\frac{3}{8}$ -in. to provide only a line of contact between a shingle and the one below to prevent capillary creep of water between shingles.



General view of concrete products plant operated by Basalt Rock Co., Inc., at Napa, Calif.

vertical steel on 32-in. centers, extending through the air spaces and tying into the footings and the bond beam at the story height. Similarly, bond beams above and below the windows were tied in with the vertical steel. Outside, the wall was covered with a white portland cement stucco. Masonry courses consisted of a Spanish-type extruded, or hanging, joint that is popular and at the same time accentuates the unit well.

All the other rooms were constructed with units 8 in. high, 16 in. long and 6 in. thick, using reinforcing mesh inside and out. Painted white with recessed mortar joints, the individual courses were plainly visible.

### Acoustical Veneer for Walls and Concrete Shingles

Another new development was on display in the living room and dining room of the house, where the walls were veneered with a 2-in. thickness of pumice acoustical veneer. In the dining room 20- x 30-in. slabs were used, and in the living room a 4- x 16-in. face was exposed, both painted with a very thin coating of white cement paint. High acoustical value in these units is developed by increasing the proportion of coarser particles in the concrete mix. Basalite concrete was poured for the floor and covered with wood flooring in this construction.

To top the house off, the roof was

25,000 visitors a week was estimated, 244,000 people having visited the house from June 24 through August 31 by actual count.

Aside from the attractiveness of the house, the location was ideal. Homes and Gardens Court was very near to the Tower of the Sun, which was the hub of activity, and "The Californian" was directly in the center of the Court.

Admission was free and visitors passed through the house, entering at the living room and leaving through the garage where a group of masonry panels were on display. A representative of the Basalt Rock Co., and one from the San Francisco office of the Portland Cement Association were always there to answer questions about concrete masonry and to take down names of prospects. One of these men, stationed in the living room, described the general construction through a loud speaker system with outlets in all rooms, the other, in the garage, discussed construction details.

### Picking "Live" Prospects

To simplify the task of segregating those interested in building a home from the average run of visitor, none were required to register. Only those who showed a real interest were asked to register. At the exit attractive folders were handed out, showing the floor plan and photographs of the house, a photograph of the "basalite" plant, an enumeration of

Interest in "The Californian" was far greater than hoped for, and material benefits to the sponsors in the form of business directly attributable to the home were gratifying. By actual count, 15,000 out of a total of 74,000 at the Fair over a week end visited "The Californian." Throughout the year an average of 20,000 to

Living room interior of the concrete masonry home exhibited at the California Fair. Walls are veneered with acoustical pumice units and floor is poured and covered with wood flooring



the advantages of concrete masonry construction with a detachable slip to be filled out by those interested in more information.

Prospects were evaluated by the representatives on duty and segregated for followup. An average of 25 good prospects per day for concrete houses was developed, of which 10 were immediate, live prospects ready to be sold a house. In addition a number of visitors indicated a possibility of building in the future which undoubtedly points to more business to come later.

Nationally, as well as locally, the demonstration has proved of value, since a number of interested people were from other States. Many of them asked how to go about building a concrete house in their community and were advised to see their local concrete products manufacturer. To sum it all up, the demonstration has revived interest in concrete masonry in California, and has played no small part in aiding to promote it nationally.

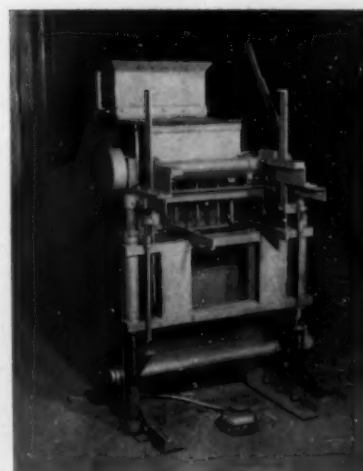
While "The Californian" was open for public inspection, Basalt Rock Co. featured this exhibit and another, the Eugene O'Neill house, in a 2-page advertisement appearing in the August issue of *Architect and En-*

*gineer*, a California publication. The Portland Cement Association likewise built its advertising around the house in the same issue. The Plan Book of 1939 put out by *California Homes*, a San Francisco magazine, is carrying photographs, plans, taxes, insurance rates and other statistics pertaining to the house.

Basalt Rock Co., aside from the push given its sales by the opportunity presented by the Fair, has worked up a dealer organization for its products covering a radius of 200 miles. Leads developed by the Portland Cement Association through its advertising in national home magazines are followed through religiously, as well as building reports, etc., concerned with territory within a practical trucking radius.

### Vibrator Block Machine

CONCRETE TRANSPORT MIXER Co., St. Louis, Mo., has announced a new vibrator block machine which weighs 700 lb. and covers a floor space of 4- x 4-ft. with a height of 5-ft. The Kirkham Vibrator, as it is called, has only one moving part, the vibrator, which is enclosed and runs in oil. Vibration is applied directly to the mold box to give direct, positive vibration to the concrete. It is said



Light weight vibrating type block machine has a production of 600 standard block in eight hours

that the machine will produce 300 standard 8- x 8- 16-in. block or 3600 brick in 8 hr. with a two-man crew.

LAUCHNOR MACHINE SHOP AND CEMENT BLOCK MANUFACTURING CO., located near Andreas, Penn., has been totally destroyed by fire. The loss, estimated at \$50,000, was partially covered by insurance.



**UP TO 320 CONCRETE BRICK PER SACK OF CEMENT** with strengths running as high as 3700 lbs. p.s.i. and absorptions as low as 6.7% is being had by some producers using Jackson & Church Brick Machinery.

**LOW COST INSTALLATION: NO PALLETS NEEDED: LOW MAINTENANCE COST,** and producing brick that are uniform in size with clean cut, sharp edges and beautiful textures, either colored or plain. Will make brick from either light weight aggregates or sand concrete.

**DEMAND FOR CONCRETE BRICK** is increasing every day, millions sold every year. Let us show you the profits that can be had when making them on Jackson & Church equipment.

28,000 Brick a day, capacity of the Model "A" Brick Machine.

14,000 Brick a day, capacity of the Model "C" Brick Machine.

**INVESTIGATE TODAY,** get into production for the coming spring business. Our engineering department is at your disposal to assist you in your equipment selection and plant layout.

Since 1881

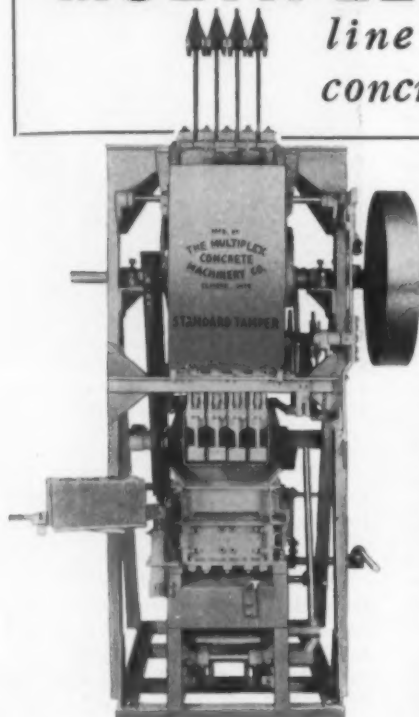
**Jackson & Church Co.**

SAGINAW, MICH.



Workmen Removing Brick From Machine

# MULTIPLEX . . . presents a complete line of equipment for the concrete products producer



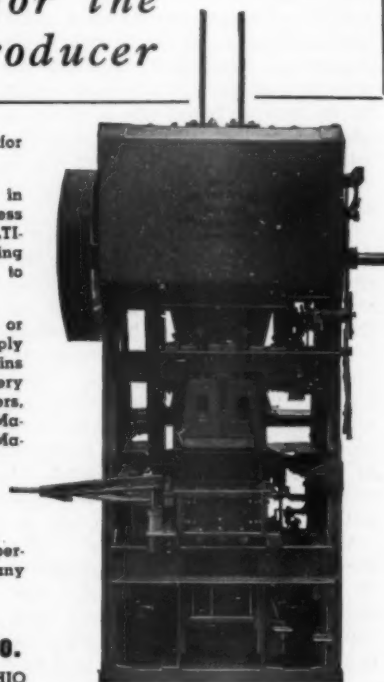
MULTIPLEX makes the ideal equipment for every concrete products purpose.

Neither time nor effort was spared in making this equipment to give faultless performance under all conditions. MULTIPLEX engineers have overlooked nothing that could add stamina or economy to concrete products operations.

Whether you want a single small unit or a complete plant, MULTIPLEX can supply your wants. The MULTIPLEX line now contains over twenty models with a machine for every purpose: Hand Machines, Double Strippers, Single Strippers, Tile Machines, Flue Block Machines, Random-Ashlar Machines, Brick Machines, Molds, Forms, Power Machines, Power Presses, Power Tampers, Power Strippers, Super Tampers, Mixers, Curs and Racks.

Be sure to check MULTIPLEX features, performance, and service before you buy any new equipment. Write for details.

**Multiplex Concrete Machy. Co.**  
ELMORE . . . . . OHIO



## COMMERCIAL'S New Catalog



**"JUST  
OFF THE  
PRESS"**

**WRITE  
FOR IT**

*The* **COMMERCIAL SHEARING &  
STAMPING COMPANY**  
YOUNGSTOWN, OHIO.

## Another FEATURE SECTION OF CONCRETE PRODUCTS COMING IN FEBRUARY

As this is the off year of the biennial exhibits at the Concrete Industries Exposition this issue will be used more extensively than ever as a buying reference by concrete products producers everywhere.

Equipment manufacturers will devote more space to describing the latest improvements to their machinery.

Concrete products producers will read it with utmost interest in their search for information on sources of supply for the materials, machinery and equipment they need.

Our editors are searching for all the latest improvements in equipment and operating methods and will report them in their clear, concise, accurate style which has won for them universal recognition as the industry's authorities.

Don't miss the February issue—the only complete buying guide for the industry—the outstanding advertising opportunity of the year.

**ROCK PRODUCTS**  
309 WEST JACKSON BLVD.  
CHICAGO, ILLINOIS

## Large Pipe Order

UTAH CONCRETE PIPE CO., Salt Lake City, Utah, has a U. S. Bureau of Reclamation contract for \$522,371 to furnish 8700 ft. of flow line concrete pipe for the Salt Lake-Provo aqueduct to carry water from the Deer Creek dam at Provo to Salt Lake City and intermediate towns. The pipe are to be 20 ft. long, 69 in. inside diameter, and will be fitted with precast collars and steel expansion joints with rubber gaskets. Production is to start immediately at a plant nearing completion at Pleasant Grove, near Provo, Utah, and about 500 days will be allotted to fulfill the contract. Pipe will be cast vertically and vibrated into the molds. The order is the first leg of a contract totalling 43 miles of pipe in all.

## National Concrete Masonry Convention

NATIONAL CONCRETE MASONRY ASSOCIATION is offering a varied program of business and entertainment for the 1940 convention which will leave Chicago this year to meet at the Mayflower Hotel, Washington, D. C., February 12-14. According to advance information, there will be featured subjects of interest to all products manufacturers and all are in-

vited to attend. There will be no registration or admission fee. Separate meetings will be on manufacturing developments in the industry, including a discussion of the Wisconsin University durability tests; promotion; and precast concrete floors. There will be a separate meeting of the National Cinder Concrete Products Association and an afternoon spent as guests of the National Bureau of Standards. Other features are to be the annual banquet, sight-seeing trips and immediately after the convention, a party of concrete products manufacturers will make a combined vacation and business trip by steamship to Florida. Those interested in the trip, which will provide an opportunity to see how Florida uses concrete masonry, are urged to make their reservations immediately with Louis Brookman, Jr., transportation manager, 400 W. Madison Street, Chicago.

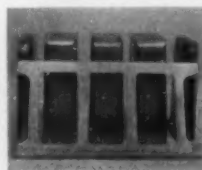
## New Concrete Block Specialty

SPOKANE LOC BLOCK CO., Spokane, Wash., recently incorporated with a capital structure of \$50,000, will manufacture a special concrete block. Machinery is being installed in a 50- x 100-ft. building. Officers of the company are E. E. Eddy, president; L. Bumgarner, vice-president; and C. W. Sommer, secretary-treasurer.

## Start Cinder Concrete Plant In Raleigh, N. C.

THE STANDARD CINDER BLOCK CO., Raleigh, N. C., is now in operation turning out both standard and special shape blocks. All products of the plant will carry Underwriters Approved labels, according to the announcement. Julius H. Gray is owner and operator of the plant.

## Cores and Pallets



**HARDENED BLOCK CORES**  
Outlast Three Sets of Cast Iron Cores  
**CAST IRON PALLETS**  
Write for Prices  
**MINEAR FOUNDRY**  
2615 Dean Ave.  
Des Moines Iowa

## Cement Colors

## STAR and ANCHOR COLORS

Geo. S. Mephram Corp., East St. Louis, Ill.  
C. K. Williams and Co., Easton, Penn.



We help you get started so that your success is assured by showing you how to investigate the market possibilities. Then we show you a UNIVERSAL machine in actual operation producing the highest quality concrete pipe meeting every specification requirement.

A UNIVERSAL makes every size from 6 inches to 48 inches, both bell-end and tongue-and-groove. Built for a lifetime of trouble-free service.

Send for details and catalog today

**UNIVERSAL CONCRETE PIPE CO.**  
Incorporated  
COLUMBUS, OHIO

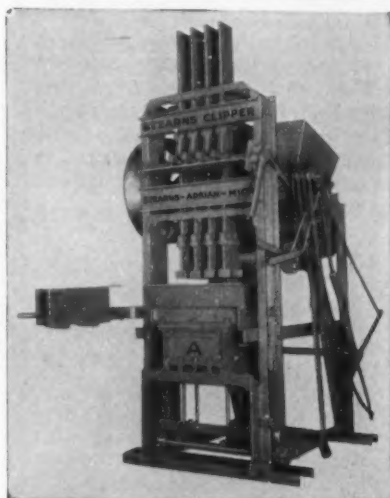


- Vibration
- Pressing
- Uniform Density
- Trowelled Surfaces

Write for Information

**KENT-ROOT VIBRA-PRESS**

**The KENT MACHINE CO.**  
CUYAHOGA FALLS, OHIO



## "ANCHOR"

Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service. Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns joltcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.  
Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

**Anchor Concrete Mch. Co.**  
G. M. Friel, Mgr. Columbus, O.

### Lone Star Improvements at Spocari

LONE STAR CEMENT CORP., New York, N. Y., is installing unit coal pulverizers for firing the kilns together with the necessary coal handling equipment, and re-arranging the rock dryer to utilize waste heat from the kilns for drying at the Spocari, Ala., plant. The coal handling installation is to be of the most modern design and equipped with complete kiln control. The rock dryer will be equipped with induced draft and a complete dust collecting system is to be installed, with the entire installation arranged for control from the burner platform. These improvements, which will shortly be finished will not increase the mill capacity but are designed to increase production efficiency.

### Building Gypsum Plant in Bronx, N. Y.

NATIONAL GYPSUM CO., Buffalo, N. Y., is reported to have started its expansion program at the Bronx, New York, which involves construction estimated at about \$2,000,000. The plaster plant formerly operated by the Atlantic Gypsum Co., later taken over by the National Gypsum Co., is to be enlarged and a gypsum board plant built with a production of 400,000 sq. ft. a day. A complete line of National products will be manufactured. The expansion program is scheduled for completion early in 1940.

### Foreign Cement Makers Buy Dust Collectors

DUST COLLECTING equipment has recently been shipped to several foreign cement companies by the W. W. Sly Manufacturing Co., Cleveland, Ohio. Lone Star Cement Corp., Argentina, South America, has been shipped a large dust control system. Dust filters have been shipped to the Peruvian Portland Cement Co., Lima, Peru and to Amsterdam, Holland for the Nederlandseh-Indische Portland Cement Maatschappij.

### Reduce New England Sand and Gravel Rate

THE I. C. C. authorized by fourth section order No. 13621 to establish and maintain on sand and gravel, other than ground or pulverized, in closed cars, or in open top cars with tarpaulin or other protective covering, min. 100,000 lb. from Pinewald and Williamstown Junction, N. J. to Medford, Mass., rates of not less than \$2.78 a net ton, without observing the long-and-short-haul part



of section 4. The relief authorized was predicated on the existence of a rail-water-rail rate of \$2.68 between these points, and in the event that any increase should be made in the rail-water-rail rate the all-rail rate authorized should be correspondingly increased.

### Tightening Enforcement of Wage-Hour Law

FAIR LABOR STANDARDS ACT administration has adopted a decentralization plan, giving wider discretion to regional officers in enforcement. According to the latest interpretive bulletin of the wage and hour division, revised for the 42 hour maximum work week effective Oct. 24, 1939, the Act takes a single work week as its standard and permits no averaging of hours over two or more weeks. In other words, even though the average number of hours worked

in two or more weeks is less than 42 hours, the employee will receive time and one-half for the hours worked over 42 in any of the weeks.

### To Recondition Silica Unit Recently Purchased

WHITE ROCK SILICA Co. plant and equipment, near Browntown, Wis., has been purchased by the operators of Hartland Washed Sand and Gravel Co. with sand and gravel plants at Verona, Wis., and Hartland, Wis. The sale was completed through bankruptcy proceedings for \$13,000. The new owners plan to recondition and operate the plant.

### Oklahoma Mill Gets Safety Trophy

OKLAHOMA PORTLAND CEMENT CO., Ada, Okla., operated without a lost-time accident during 1938 and received the Portland Cement Association safety trophy for that record at a recent appropriate plant ceremony. The monument was unveiled by A. J. R. Curtis, safety director of the Portland Cement Association.

### Silica for Canada

OTTAWA SILICA Co., Ottawa, Ill., recently shipped a 1450 ton cargo of silica sand into Chicago by barge on the Illinois waterway where it was transferred to the steamship Thorold, a Chicago Tribune paper boat, for delivery to Canada. This is the first shipment of silica to Chicago on the waterway. The sand was delivered to the Exolon Co., Thorold, Ontario, to be used for manufacturing glass and carborundum.



Silica being loaded into the steamship Thorold in Chicago

## PRICES BID

### Contracts Let

DURHAM, N. C.: The Bragtown quarry has reduced the price on 1-in. crushed stone from \$2 to \$1.75 per ton, and the price on 2-in. stone from \$1.50 to \$1.40 per ton. The Bragtown quarry produces approximately 4000 tons of crushed stone each month for local consumption.

BLOOMINGTON, ILL.: Prothero & Willis were awarded contract to furnish 460 cu. yd. of gravel for the resurfacing of Hovey Avenue from Adelaide Street west to the city limits. Their bid was 97c a cu. yd.

SANDUSKY, OHIO: Kelley Island Lime and Transport Co. has a contract to furnish the city 200 tons of lime at \$8.25 per ton.

PORTLAND, ORE.: Ross Island Sand & Gravel Co., was awarded the contract for batching and delivery of 3000 cu. yd. of sand and gravel aggregates to the cement mixer at Portland-Columbia airport with a bid of \$1.16 per cu. yd.

WACO, TEXAS: Universal Atlas Cement Co. was reported low bidder on a federal contract to furnish portland cement for construction of outlet works for the Denison dam. The company's bids were \$1.305 per bbl. for 280,000 bbl. of bulk cement and \$1.49 per bbl. for 2000 bbl. of bag cement.

WASHINGTON, D. C.: Gravel Products Corp., Buffalo, N. Y., has a federal W.P.A. contract for \$24,340 to furnish ready-mixed concrete.

WASHINGTON, D. C.: Calaveras Cement Co., San Francisco, Calif., was low bidder, on a mill basis, for 80,000 bbl. of low heat portland cement to be used in the construction of Parker dam. The bid price was \$1.22 per bbl. as compared to the bids of Monolith Portland Cement Co. at \$1.37 and Riverside Cement Co. at \$1.40. Bids were quoted f.o.b. cars or trucks at the mills, indicating that the award will be made to the company submitting the lowest total for price plus transportation costs.

JOPLIN, MO.: Newton County Lime Association has made arrangements with the Southwest Lime Co., Neosho, to furnish 7000 tons of lime to

association members for \$1.60 per ton delivered or \$1.90 delivered and spread.

KENTON, OHIO: Washington Township has awarded contracts for stone to surface roads. C. W. Modd of Kenton was awarded a contract for 2075 tons at 68c per ton, and H. G. Wright of Forest will furnish 1850 tons at 80c per ton.

### Big Cement Orders

CONTRACTS for portland cement totalling about 7,000,000 bbl. are reported to have been let to Eastern

cement mills by the Board of Water Supply of New York City. The cement is to be used for construction on the new Delaware River project in New York State scheduled for completion in 1945.

### Damages Awarded to Sand Companies

KANSAS SAND CO., and The Consumers Sand Co., both of Topeka, Kan., are to be paid \$7,650 and \$4,800 respectively by the city of Topeka for damages and rights-of-way in connection with the construction of dikes in North Topeka.

### MATERIALS METHODS FACILITIES EXPERIENCE ORGANIZATION



## Five Vital Points—

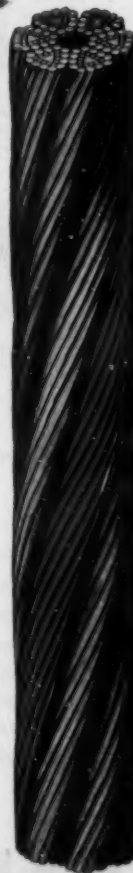
that Bring Long Life to

### "HERCULES" (Red Strand) WIRE ROPE

CONSISTENT top-flight performance is never a matter of chance, and the year by year record of dependable field service that "HERCULES" (Red-Strand) Wire Rope has established, is due to our strict adherence to all details of manufacture. These details start with the selection of proper materials, and they follow through until the last test and inspection has been made and approved by experienced workmen.

Because nothing is left to chance in the manufacture of "HERCULES" (Red-Strand) Wire Rope, you can depend on it for longer life . . . lower operating costs . . . more satisfaction. Why not give it a trial?

Available in both Round Strand and Flattened Strand constructions—in either Standard or Preformed types



## A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS  
5909 KENNERLY AVENUE

ESTABLISHED 1857  
ST. LOUIS, MISSOURI, U.S.A.

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# HARDINGE

*says*



The Conical Scrubber is the only device that disintegrates clay balls without damage to the stone or sand, and which operates with practically no maintenance cost. Write for information and Bulletin.

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 CHICAGO, 205 W. Wacker Drive  
 SAN FRANCISCO, 501 Howard St.  
 TORONTO, 159 Bay Street

## FINANCIAL NOTES

### RECENT DIVIDENDS ANNOUNCED

Arundel Corp. ....	\$0.25	Dec. 27
Arundel Corp., extra....	.50	Dec. 27
Bessemer Limestone & Cement Co., pfd.....	4.50	Dec. 26
Florida Portland Cement Co., pfd. (arrears Dec. 2, \$75.25) .....	5.00	Dec. 1
Glens Falls Portland Cement Co. ....	.50	Dec. 15
Glens Falls Portland Cement Co., pfd.....	1.50	Jan. 1
Idaho Portland Cem. Co..	4.00	Dec. 9
Ideal Cement Co.....	.35	Dec. 20
Ideal Cement Co., special	.50	Dec. 20
Lawrence Portland Cement Co. ....	1.00	Dec. 15
Lehigh Portland Cement Co., special .....	.25	Dec. 30
Lone Star Cement Corp., extra .....	.25	Dec. 11
Longhorn Portland Cement Co. ....	.75	Dec. 20
Medusa Portland Cem. Co.	1.00	Dec. 22
Medusa Portland Cem. Co., pfd. ....	1.50	Dec. 23
Minnesota Mining & Mfg. Co. ....	.75	Dec. 22
Missouri Portland Cement Co. ....	.75	Dec. 20
Monolith Portland Midwest Co., pfd. (arrears Dec. 16, \$9.75).....	.25	Dec. 15
National Gypsum Co. ....	.25	Dec. 11
National Gypsum Co., pfd. ....	1.12½	Dec. 1
New York Trap Rock Corp. (common) ....	.25	Dec. 11
Northwestern States Portland Cem. Co., extra....	.40	Jan. 2
Pennsylvania Glass Sand Co. ....	.75	Dec. 20
Pennsylvania Glass Sand Co., pfd. ....	1.75	Jan. 1
Southern Phosphate Corp. ....	.15	Dec. 15
Superior Portland Cement Co. ....	.82½	Dec. 23
Yosemite Portland Cement Co. ....	.10	Jan. 1

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., had an indicated profit of \$32,453 for the quarter ended September 30 after all expenses including depreciation and depletion but before provision for federal income taxes. For the nine months ended September 30, 1939, the company reported a net loss of \$14,275 after all charges including depreciation and depletion. The company spent about \$300,000 during the first 11 months of 1939 in modernization of its wholesale and retail plants and for purchases of trucking equipment.

GYPSUM, LIME AND ALABASTINE, CANADA, LTD., Paris, Ont., Canada, earnings for the year ended Nov. 30, 1939, are higher than in any year since 1930. It is expected that the company's annual report will show a net profit of 40c to 50c a share on its common stock. This compares

with 17c a share in the year ended Nov. 30, 1938. Operations of Standard Lime Co., Ltd., a subsidiary, will show a small profit for the 1938-39 period as contrasted to an operating loss in 1937-38. Improvement is largely due to increased sales of lime to pulp and paper companies.

BOSTON SAND AND GRAVEL CO., Boston, Mass., has extended outstanding \$288,500 principal amount of debenture 7s due Oct. 1, 1939, to Oct. 1, 1949, without change of interest rate pursuant to the bond extension plan announced on April 20, 1939.

NORTH AMERICAN CEMENT CORP., Albany, N. Y., has announced to holders of income 6½s, 1953, an offer to exchange not exceeding \$600,000 of bonds for an aggregate principal amount of new series B fixed interest 6 percent notes dated Nov. 1, 1939, due Sept. 1, 1948, equal to 50 percent of the bonds, exclusive of accrued interest. The total amount exchangeable includes \$200,000 bonds already received by the company at the date of the letter, October 26, 1939. Series B notes will be allotted pro rata if amount of bonds delivered exceeds \$600,000. Under the offer, a maximum of \$300,000 of the \$750,000 authorized series B notes would be issued. The company may at its discretion issue the balance of such notes in exchange for income 6½s or for other purposes upon such terms as it may decide, provided that the other notes may not have a maturity prior to Sept. 1, 1948.

SCHUMACHER WALL BOARD CORP., Los Angeles, Calif., reported a net profit of \$90,681 for the six months ending Oct. 31, 1939 as compared to \$73,943 for the same period in 1938. Earnings were equivalent to \$3.19 on the preferred stock and \$0.94 on the common stock.

ARROW SAND AND GRAVEL CO., Columbus, Ohio, owned by the same interests as the Marble Cliff Quarries Co., Columbus, will operate as a division of the latter company following the recent filing of articles of dissolution dissolving the corporate setup of the company with the Sec-

retary of State of Ohio. Title to all the property owned by the Arrow Sand and Gravel Co. in Franklin County has been transferred to the Marble Cliff Quarries Co. The latter company has filed a registration of the trade name of the Arrow Sand and Gravel Co. at the Secretary of State's office. The company started business in 1920 with an authorized capital of \$470,000, consisting of 3200 shares of \$100 par value common stock and 1500 shares of \$100 par value preferred stock.

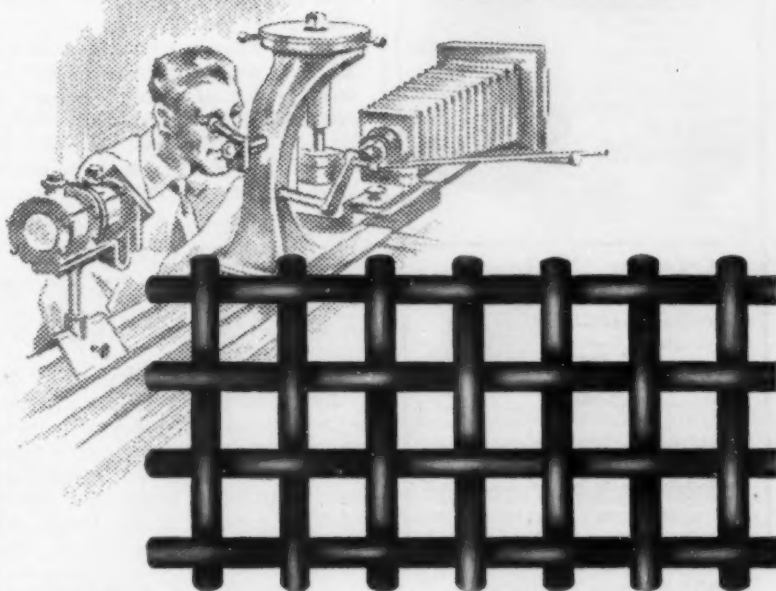
NEW YORK TRAP ROCK CORP., New York, N. Y., has announced a dividend of \$1.75 per share to be paid Jan. 2, 1940 on its outstanding preferred stock. This payment covers three months ending Dec. 31, 1939 and settles preferred stock dividends in full to that date. A common stock dividend of 25c per share was paid Dec. 11, 1939.

The company stated that in addition the following sinking funds on the first mortgage bonds and participation payments on the stamped first mortgage bonds and debentures, or second mortgage bonds, to correspond with the above dividends were authorized and will be provided as follows: Sinking fund on first mortgage bonds, \$19,334, to correspond with the preferred stock dividend, and \$44,972.50 to correspond with the common stock dividend, under the Supplemental Agreement dated Jan. 1, 1935; participation payments, \$2.50 per \$1,000 par value on the debenture 7's to correspond with the dividend of \$1.75 per share on the preferred stock under the terms of the second mortgage dated Jan. 1, 1935, and \$2.50 per \$1,000 first mortgage bond to correspond with the dividend of 25c per share on the common stock, under the Supplemental Agreement dated Jan. 1, 1935.

BESSEMER LIMESTONE AND CEMENT Co., Youngstown, Ohio, has called about \$600,000 of 6 percent bonds for retirement January 1 at par and accumulated interest. Funds will be partly provided by a bank loan.

MEDUSA PORTLAND CEMENT Co., Cleveland, Ohio, directors voted another dividend of \$1 a share payable Dec. 22. to stock of record Dec. 19, and \$1.50 on preferred payable Jan. 2 to stock of record Dec. 23. This makes \$2 paid on the common stock in 1939, which compares with nothing distributed in 1938, \$1.50 in 1937 and \$2.50 in 1936.

## WE'LL NEVER SATISFY THESE **RESEARCHING EYES!**



"NEVER let *well-enough* alone" is the policy of the Roebling Research Laboratory. It is the business of our research men to be eternally dissatisfied. Their job is not to tell us how good our product is—but to discover, if possible, how we can make it better.

When you buy Roebling Screening you have the assurance that it is the result of constant research—in one of the country's most modern and completely equipped industrial research units.

You can obtain Roebling Wire Screening in many types and metals to meet a wide range of efficiency, vibration and abrasion requirements—and for every sizing, cleaning and grading service.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N.J.

*Branches in Principal Cities*

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TRADE JERSEY MARK

90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE

"Established in 1885"

## ROADS

whether mountain or farm to market under any condition you can depend on

### GRUENDLER EQUIPMENT

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#### JAW CRUSHERS

Bronze or Roller Bearing

Heavy armor plate steel or cast steel.  
Heavy Duty Construction  
Large capacity  
Small power Requirements



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Self Travelling Tractor

Ideal for maintenance road work



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Stationary or Portable

Wide crushing range, crushes stone 2 1/2" down to agriculture dust.



Portable 2 in 1 Hammer Crushers

## GRUENDLER

CRUSHERS - PULVERIZERS - GRINDERS

GRUENDLER CRUSHER & PULVERIZER CO.  
2920-28 N. Market St., St. Louis, Mo.

### Cement Statistics

BUREAU OF MINES reports that the portland cement industry in November, 1939, produced 11,053,000 bbl., shipped 10,146,000 bbl. from mills and had in stock at the end of the month 20,776,000 bbl. Production and shipments in November, 1939, showed increases of 8.5 and 18.3 percent, respectively, as compared with November, 1938. Stocks at mills were 6.3 percent lower than a year ago.

In the following statement of relation of production to capacity, the total output of finished cement is compared with the estimated capacity of 161 plants at the close of November, 1938 and 162 plants at the close of November, 1939.

#### RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	Nov. 1938	Oct. 1939	Sept. 1939	Aug. 1939
The Month...	48.2	52.1	57.2	56.3
12 Months...	40.6	46.6	46.3	45.9

### Mineral Dressing

UNDER the title "Principles of Mineral Dressing," McGraw-Hill Book Co., New York, has published a book by Prof. A. M. Gaudin, Massachusetts Institute of Technology, which deserves a place in the library of rock products men. The book is writ-

ten in mining terms and all its references are to mining literature. Only such use of "mineral dressing" in the rock products industry as could be found in mining literature appear to be known to the author.

While classification of concrete sand and flotation of cement slurry are not usually referred to in the literature of these industries as "mineral dressing" they are such in the author's definition. In the rock products industry practice has got ahead of theory. The book is just what its title implies, and it is written in language any one can understand. It sells for \$5.

### Agricultural Limestone

LAWRENCE COUNTY STONE CO., Black Rock, Ark., is producing agricultural limestone from a quarry used years ago in the manufacture of lime. Stone is pulverized in a hammer mill driven by a 40-hp. steam engine. From the quarry the stone is delivered into a bin by cable-drawn tram cars and feeds by gravity into the mill. W. E. Verkler, Black Rock, heads the company.

### Sand Lime Brick Production and Shipments

EIGHT active sand-lime brick plants reporting for November and nine for October, statistics for which were published in December.

#### AVERAGE PRICE FOR NOVEMBER

	Plant Price	Delivered Price
Detroit, Mich.....	.....	\$14.50
Milwaukee, Wis.....	\$10.00	12.00
Saginaw, Mich.....	10.90	.....
Seattle, Wash.....	14.50	16.50
Syracuse, N. Y.....	14.00	16.00 C/L 20.00 L/C

#### STATISTICS FOR OCTOBER AND NOVEMBER

	October	November
Production .....	2,048,795	1,540,700
Shipments (rail) ..	338,000	185,000
Shipments (truck) ..	2,198,962	1,627,950
Stock on hand....	620,665	855,559
Unfilled orders ...	635,000	430,000

†Nine plants reporting: incomplete, one not reporting production, four not reporting stock on hand, and six not reporting unfilled orders.

‡Eight plants reporting: incomplete, one not reporting production, three not reporting stock on hand, and four not reporting unfilled orders.

### Concrete Pavement Yardage

AWARDS of concrete pavement for November, 1939, have been announced by the Portland Cement Association as follows:

Type of construction	Sq. yds. awarded during Nov.	Total sq. yds. during first 11 months
Roads .....	2,490,611	26,466,637
Streets and Alleys ..	1,227,582	17,523,236
Airports .....	82,723	808,827

Totals ..... 3,800,916 44,798,700

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MAINTENANCE ON FLEXOMOTIVE DRIVE ..... NONE

REPAIRS ..... NONE

JOBS ..... HAULING, SWITCHING (Others?)

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Division of Fate-Root-Heath Co.  
PLYMOUTH, OHIO

**Plymouth**  
**FLEXOMOTIVE**  
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## Chemical Industries Exposition

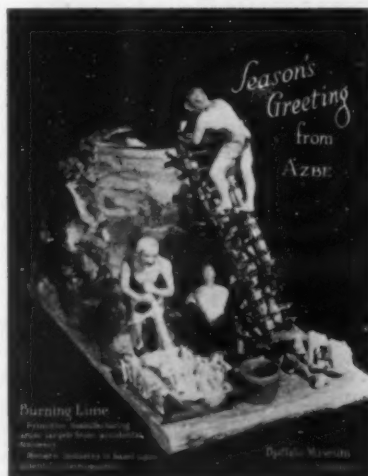
SEVENTEENTH exposition of the chemical industries, held December 4 to 9 at Grand Central Palace, New York, was one of the most successful in history. Among products on display, of interest to producers of rock products, were insulating materials, such as asbestos, magnesite, rock cork, siliceous brick; diatomaceous products; refractories in block and tile forms; new welding equipment; nickel alloys; crushing, grinding and separation machinery; pumping equipment; material handling equipment, including stackers, lifts, racks, conveyors, portable elevators; laboratory equipment; safety devices for use in all types of industrial plants; dust collecting systems; power plant and electrical equipment.

## Reclaim Gravel Lands

IDEAL SAND AND GRAVEL CO., Mason City, Iowa, is leveling off land from which the topsoil had been removed in excavating gravel and plans to return it to productivity. Sixteen years ago 60 acres were levelled which are now productive and at present an additional 120 acres are being reclaimed at the rate of three acres a day, using bull-dozers, blade graders and draglines to do the work. B. N. Dilts, Mason City contractor, is assisting with the work.

## Moves Terrazzo Plant

ARKANSAS BLACK MARBLE CORP., Batesville, Ark., is now operating its terrazzo plant at the quarry where it was recently moved from Batesville to cut haulage expense. This is said to be the only company in the United States manufacturing black marble terrazzo from native marble. The



One of the most unique Christmas cards received in the office this season

process involves reduction first through a jaw crusher, then a hammer mill, and sizing through revolving screens.

## Injunction Against Permanente Denied

THE PERMANENTE CORP. new cement mill near Los Altos, Calif., will not prove a noise or dust nuisance according to a court order handed down December 12. Los Altos residents had appealed for a new trial after the court had denied them an injunction against the company on September 21, 1939.

## New York Cement Mills at Capacity

NORTH AMERICAN CEMENT CORP., Alsen, N. Y., plant and the Alpha Portland Cement Co. plant at Cementon, N. Y., have been reported operating to full capacity late in the construction season. State construction projects were largely responsible for the increased activity.

## New Hydraulic Sand Plant

LEO BASSETT, Derby, Kan., has installed a sand pumping operation adjacent to the abandoned sand pit of the Consumers Sand Co., near Mulvane, Kan. The pump is driven by a stationary gasoline engine and will supply sand principally for road construction.

## Damaged by Fire

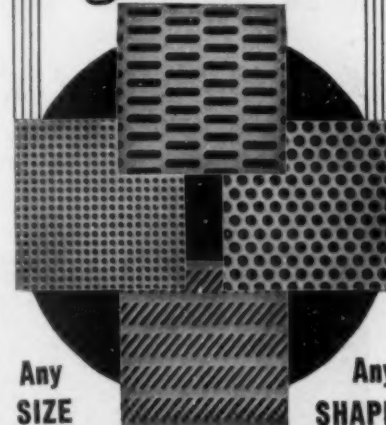
BOUND BROOK CRUSHED STONE CO. plant at Bound Brook, N. J., was recently damaged to the extent of \$25,000 by fire. A machine shop and warehouse were destroyed. Company forces assisted fire companies in preventing the fire from spreading to the main structure.

G. AND W. H. CORSON, INC., Plymouth Meeting, Penn., lime plant was damaged by fire recently. Damage, in the hydrate building, was estimated at \$2000.

MONTGOMERY BROS. Marshall, Ill., had their crushed stone plant destroyed by fire with damage estimated at about \$15,000. Incendiarism is suspected as being the cause of the fire.

ARCHBOLD SAND AND GRAVEL CO., Evansville, Ind., is planning to rebuild its plant recently destroyed by fire. Most of the damage was covered by insurance. The plant is located on the Ohio River.

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answer the problem—  
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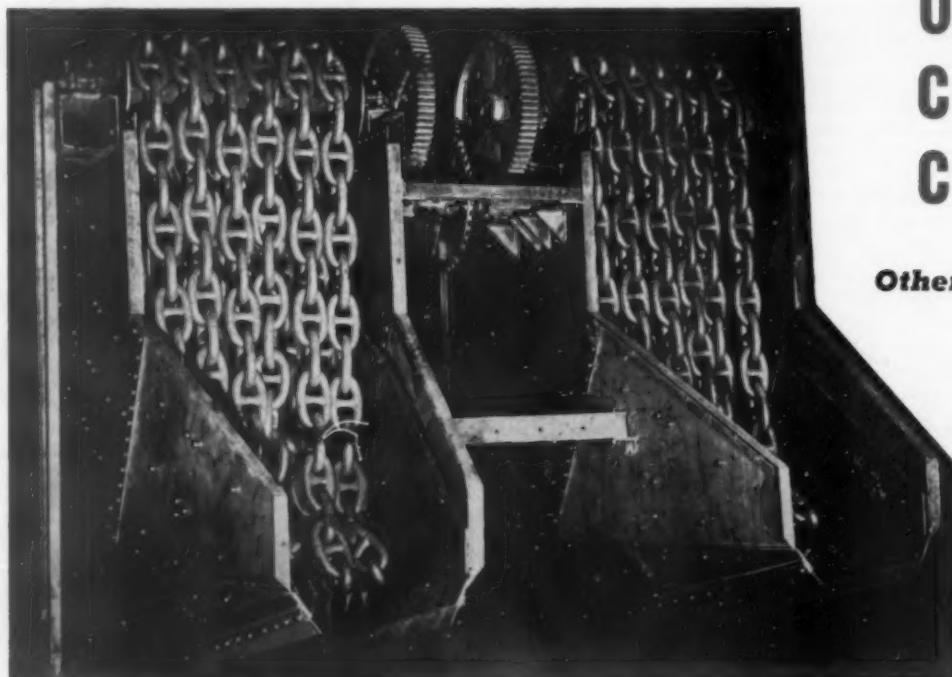
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Completely control the flow of any size material from storage bins, hoppers or open-dump chutes to crushers, conveyors, screens, etc. Low in maintenance and power consumption. Furnished in sizes to suit your operation. Send full particulars for recommendations.



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Other Materials

Photo shows twin  
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signed to feed primary  
ore to 42-in. belt  
conveyors at a Canadian  
mine. Note bar griz-  
zles to screen out  
fines to belt ahead of  
larger pieces.

## ROSS SCREEN & FEEDER CO.

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Patented throughout the world

### Completing Roofing Granule Plant

STASO MILLING Co., Chicago, Ill., has practically completed construction of a new plant at Kremlin, Wis., to manufacture colored roofing granules. Cost of construction is estimated at about \$250,000.

### Permanente Mill Starts on Schedule

THE PERMANENTE CORP., Santa Clara county, Calif., began manufacturing portland cement for Shasta dam at its new mill on Dec. 25, 1939, exactly on schedule. At that time one of the two kilns was started up, producing 2000 bbl. per day. It is reported that

the ultimate capacity to be reached will probably be 8000 bbl. per day with both kilns running. Present output is being placed in inventory and shipments to the Shasta damsite will begin in March, 1940.

### Phosphate Conditions in Tennessee

REPORTS from the Tennessee phosphate field continue to be very encouraging. The year of 1939 closed with one of the best records in the industry for many years. Monsanto Chemical Co. has resumed full operations of all three furnaces and Victor Chemical Works has added two more electric furnaces and a nodulizing plant. Phosphate rock shipped

for direct application in 1939 was over 33 percent greater in amount than in 1938 and the tonnage for that market has been exceeded only three times in the last 40 years. Prices of ground rock are to be higher in 1940.

### Lime Company Expanding

THE HOLMES LIME CO., INC., San Francisco, Calif., has purchased all the assets of the Basic Limestone Products Corp., Ltd., San Francisco, and is also operating the plant of the Holmes Lime and Cement Co. at Felton, Calif. The company has moved a hydrating and processing plant to No. 1 Division St., San Francisco.

## OBITUARIES

DANIEL COLMAR, president of the Ramloc Stone Co., Albany, N. Y., died recently. He was a prominent concrete masonry unit manufacturer in Albany and for the past twenty years had been an ardent supporter of the activities of the National Concrete Masonry Association. The business will be carried on by his two brothers, Alexander and Stephen Colmar.

THOMAS A. LANAGAN, sales manager in charge of Massachusetts operations at Winchester and Worcester for the General Crushed Stone Co., died November 28.

JOSEPH M. VANN, veteran stationary engineer for Oliver King Sand & Lime Co., Knoxville, Tenn., died December 1 at the age of 69.

THOMAS P. MCGRATH, secretary-treasurer of the McGrath Sand and Gravel Co., Lincoln, Ill., passed away November 25 at the age of 53.

JAMES B. MAHER, secretary-treasurer of the Salt Lake Valley Sand and Gravel Co., Salt Lake City, Utah, died November 17 at the age of 49.

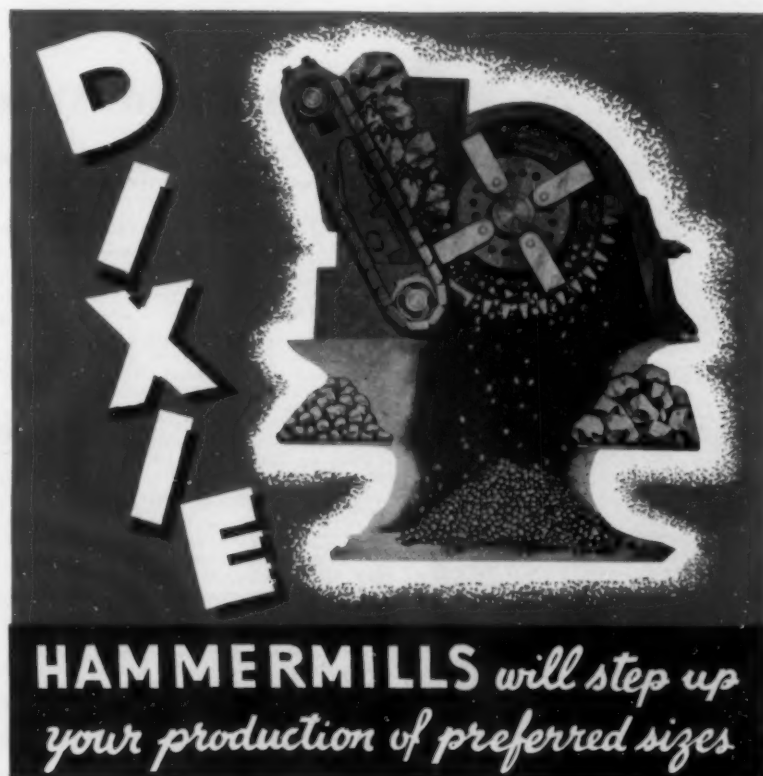
WILLIAM M. SPENCER, president and general manager of the Kansas City Quarries Co., Kansas City, Mo., died December 1 at the age of 70.

HERBERT HARRIS, who was long associated with the manufacture of lime, died November 28 at the age of 88. Born in Linkhorn, R. I., he entered the lime industry in 1890 by leasing the Harris Lime Co. He later purchased the property and also acquired control of the Dexter Lime Co. In 1919 he retired and passed the business management on to his son Burton, who is now president of the company.

FRED H. FIGEL, district sales manager for the Pacific Portland Cement Co. at San Jose, Calif., died December 8. He had been with the company for the past 29 years.

JOHN DIETERMAN, superintendent of the Wolverine Portland Cement Co., Coldwater, Mich., died November 9. He was 68 years of age.

HENRY S. GRAY, secretary-treasurer of the Louisville Cement Co., Louisville, Ky., died December 25. He was born in England, 73 years of age and had been connected with the Louisville company for 56 years.



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**HAMMERMILLS** *will step up your production of preferred sizes*

DIXIE NON-CLOG HAMMERMILLS will reduce any material, wet, dry or sticky, to any given size in a single operation with absolute uniformity. All extra large rock that is not reduced to exactly the proper size at the first stroke rebounds to the hammer points where it is struck again until it has reached the desired size and will pass through the screen bars.

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Our complete line of DIXIE STANDARD MOGUL HAMMERMILLS is similar in construction to the NON-CLOG type but are equipped with stationary breaker plates.

40 sizes for any capacity—Primary—Secondary or Fine Reduction.

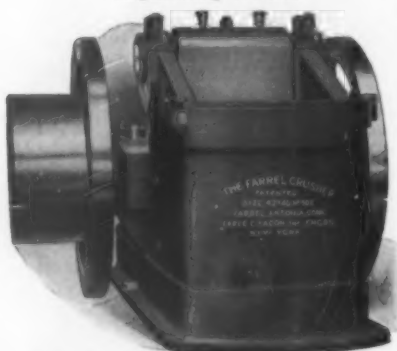
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Cast of ORO Supermang Steel—a Superior Grade of Manganese Steel—Adaptable to all makes of Hammer Mills—increases operating efficiency—greatly reduces hammer costs—Let us quote on hammers for your mill.

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## Traffic and Transportation

**PROPOSED RATE CHANGES**—The following are the latest proposed changes in freight rates up to and including the week of December 16:

### Central

60512. Establish on (a) sand (except industrial), and gravel, in open top cars (See Note 6); (b) sand (except industrial), and gravel, in closed equipment; C. L., from Chardon, Ohio; To Detroit, Mich., (a) 187, (b) 209; Bessemer, Penn., (a) \*132, (b) 176; Pittsburgh, Penn., (a) \*132, (b) 176; Rankin, Penn., (a) \*132, (b) 176.

\*Single line scale basis via B. & O. R. R. direct.

60514. Establish on sand, all kinds, and gravel, C. L., in open top cars, Chardon, Ohio, to Toledo, Ohio, 127c per net ton.

60604. Establish on sand (except industrial), sand (except industrial), in open top equipment, C. L. (See Note 6), respectively, from points in the Vassar Group, viz.: Juniata, McHale, Vassar, Wampson and Watrous, Mich.: (Rates in cents per net ton) ("A" refers to open top cars, "B" to closed top cars). To Attica, N. Y., A, 253; B, 253; Binghamton, N. Y., A, 319; B, 319; Blairsville, Penn., A, 308; B, 308; Columbia Penn., A, 363; B, 363; Coraopolis, N. Y., A, 286; B, 286; Elmira, N. Y., A, 297; B, 297; Endicott, N. Y., A, 319; B, 319; Ithaca, N. Y., A, 297; B, 297; Johnson City, N. Y., A, 319; B, 319; Johnstown, Penn., A, 319; B, 319; Lancaster, Penn., A, 374; B, 374; McKeesport, Penn., A, 319; B, 319; McKees Rocks, Penn., A, 286; B, 286; Manlius, N. Y., A, 308; B, 308; Niagara Falls, N. Y., A, 220; B, 231; Painted Post, N. Y., A, 297; B, 297; Poughkeepsie, N. Y., A, 374; B, 374; Uniontown, Penn., A, 319; B, 319; Wilmerding, Penn., A, 297; B, 297; York, Penn., A, 363; B, 363; Zellenople, Penn., A, 286; B, 286.

60529. Establish on (a) sand, in all kinds of equipment, C. L.; sand (except naturally bonded moulding; ground or pulverized sand), in closed equipment, C. L.; (b) sand, ground or pulverized, in all kinds of equipment, C. L.; (c) sand (except industrial), in open top equipment, C. L. (See Note 6), Ottawa-Utica, Ill., district to Gloversville, N. Y.; (a) 429c, (b) 472c, (c) 429c per net ton, via

C. R. I. & P. or C. B. & Q., Chicago, Ill., N. Y. C., Ponds, N. Y., F. J. & G. R. R.

60636. Establish on limestone, ground or pulverized, unburnt, C. L., min. wt. 60,000 lb., Marblehead, Ill., and White Bear, Mo., to Adrian and Jackson, Mich., 314c net ton, via C. B. & Q. to Chicago, Ill., thence connections to the extent that routing is desired. Other routes on request.

60653 (cancels W. D. A. 60457) Establish on (a) sand, naturally bonded moulding, in all kinds of equipment, and sand (except ground or pulverized), in closed equipment, C. L.; (b) sand (except natural bonded moulding and ground or pulverized), in open top equipment, C. L., Grand Haven, Muskegon and Rosy Mound, Mich., to Wilmington, Ohio, 286c per net ton.

### Trunk

38296. Riprap or rubble stone, C. L. (See Note 3), from Monocacy, Penn., to Wildwood, N. J., and Milford, Del., \$1.54 per net ton, in lieu of current sixth class rates. (See Note 5.)

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

Note 4—Reason: No present or prospective movement.

Note 5—Reason: Comparable with rates from other origins in immediate vicinity.

Note 6—Rates will not apply on shipments in cars with tarpaulin or other protective covering. In such instances the rates applicable on shipments in box cars are to be assessed.

Note 7—The oil, tar or asphaltum not to exceed 10% of weight of the commodity shipped, the shipper to so certify on shipping order or bill of lading.

*What rate per hour? What weight per day?*

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38308. Crushed stone and screenings (will not include agricultural limestone or ground limestone, unburnt; fluxing stone or firestone; or stone, coated with oil, tar or asphaltum), in straight or mixed C. L. (See Note 3), from Blue Mount, Md., to stations on W. B. & Pt. L. R. R.: 5—Brandywine to 15—Woodvale, Md., \$1.32 per net ton, and 20—Gallant Green to 55—Forest Hall, Md., \$1.43 per net ton. (See Note 5.)

Sup. 1 to 38296. Rip rap or rubble stone, C. L., min. wt. (See Note 3), from Pennington, N. J., to Wildwood, N. J., \$1.43 per net ton. (See Note 5.)

38323. Roofing granules (consisting of crushed slate or crushed stone or made from clay or from silica sand or crushed slag or iron ore tailings), C. L., min. wt. 60,000 lb., from Perth Amboy, N. J., to Waukegan, Ill. \$4.95 per net ton. (See Note 5.)

38335. Slag, crude, other than granulated or expanded, C. L. (See Note 3), from Birdsboro, Penn., to Elizabethport, N. J. (to apply on traffic destined beyond via water), \$1.06 per net ton (to apply only as a proportional rate on slag transhipped to vessels at Elizabethport, N. J., when destined to points within the free lighterage limits of New York Harbor or to points within the extra towage limits as described in W. S. Curlett's Lighterage Tariff I. C. C. No. A-620, supplements thereto or successive issues thereof. Rate does not include any extra handling except the necessary shifting of cars. When dumping is performed at Elizabethport a charge of \$5.50 per car will be made in addition to the through rate), in lieu of current commodity rate of \$1.32 per net ton. Reason: Comparable with rates from other origins.

38343 (increase). Cancel commodity rate of \$1.11 per net ton on sand (industrial) and gravel in open top cars with or without tarpaulin or other protective covering, C. L., from Lake Junction, Succasunna and Netcong, N. J., to Park Place, Penn., N. Y. O. & W. Ry. delivery. (See Note 4.)

## Southern

20885. Flintstone, ground, C. L., min. 60,000 lb. Establish from Spruce Pine and Minpro, N. C., to Knoxville, Tenn., 206c; and Chattanooga, Tenn., 266c net ton.

20922. Sand, C. L. Establish 90c net ton, Trudie, Ga., to Yukon, Fla. Water competitive. Expires 12-31-40.

20958. Feldspar, C. L., min. 60,000 lb. Establish 175c net ton, Bryson, N. C., to Spruce Pine and Minpro, N. C., and Erwin, Tenn. Truck competitive. Expires 12-31-40.

20995. Establish 95c net ton, Gravelton, N. C., to Greensboro, N. C. Truck competitive. Expires 12-31-40.

20974. Lime, fluxing, C. L., min. 70,000 lb. Establish 282c net ton, Rausher, Tenn., to Newport, Ky.

## New England

E-41-335. Limestone, crushed or ground, also stone, crushed, other than crushed or ground limestone, in mixed C. L. with crushed or ground limestone. (See Note 2), except when actual weight of shipment loaded to full visible capacity of car is less than 90% of marked capacity of car the actual weight will be the min. wt., but in no case shall the min. wt. be less than 40,000 lb. From Alden, Ia., to these representative points rates to be as follows: Galesburg—12c per 100 lb., short line distance 234 miles, based over Rock Island, Beardstown—13c per 100 lb., short line distance 292.1 miles, based over Keithsburg.

E-41-336. Sand, gravel and stone, crushed, C. L., from Fremont, Neb., to Sioux City, Ia. Rates, present, \$1.10 per ton. Proposed, 70c per ton.

49122 (2-R). Tale tailings, min. wt. 70,000 lb., Johnson and Waterbury, Vt., to Keyport, N. J. Present—Johnson 27; Waterbury 26 (Class 25-L applicable on talc as per Item 3230 of Agent Doe's I. C. C. 365 and I. C. C. 160). Proposed—21. Reason—To accord shippers at Johnson and Waterbury, Vt., the same relative basis as has been authorized from Emeryville, Halesboro and Natural Bridge, N. Y.

## Texas-Louisiana

4236. Establish 95c per ton rate on sand and gravel, C. L., standard min. wt. from Knight Spur, Tex., to Tyler, Tex.

4326. Establish the following rates in cents per ton on crushed stone, C. L., from Lone Star Spur to Burkburnett, Byers, Dan and Petrolia, Texas: To Burkburnett, 95c; Byers, 90c; Dan, 85c; Petrolia, 90c.

4334. Establish rate of 80c per ton of 2,000 lb. on gravel, C. L., from Victoria, Texas, to Corpus Christi, Texas, to apply only on material entering into the construction of the Clara Driscoll Hotel and Apartment Building and Power House of the Central Power & Lighting Company at Corpus Christi. Rate to expire on completion of these projects or not later than June 30 1940. Same reductions in cents per ton from other origins on request.

4341. Establish rate of 57c per ton on sand and gravel, C. L., min. wt. as per Item 430, Tariff 84-C, from Byron to Terrell.

## Illinois

8925 (I. R. C.). Molding sand, C. L., (See Note 2), but not less than 40,000 lb., from Elwood and Wilmington, Ill., to La Grange, Mo. Present—\$2.87 net ton. Proposed—\$1.86 net ton.

# GENERAL



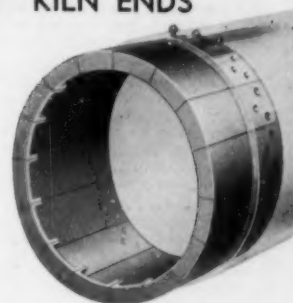
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**The Frog, Switch & Mfg. Co.**  
Established 1881  
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# News of the Industry

## Road Builders Exhibit

AMERICAN ROAD BUILDERS' ASSOCIATION is making plans for 40,000 road administrators, planners and builders who are expected to attend the 1940 Road Show-Convention at the International Amphitheater in Chicago, January 29 through February 2. Twenty percent more display space than was ever utilized before will be needed for the exhibits of new road construction machinery and materials.

## Features of the Road Show

Pioneer Engineering Works, Inc., Minneapolis, Minn., will show the inside workings of a Vibrator Duplex crushing, screening and loading plant. Also on display will be a Pioneer 40- x 22-in. roll reduction crusher and a Pioneer 4- x 8-ft. double deck inclined vibrating screen.

Gar Wood Industries, Inc., Detroit, Mich., will display actual size hoist and body units and three working miniatures of hoist and body assemblies. The complete line of road machinery also will be exhibited.

Barber-Greene Co., Aurora, Ill., will exhibit the Barber-Greene finisher, mixer, bucket loader and 30-ft. permanent belt conveyor. Motion pictures in natural color on all the Barber-Greene units also will be shown.

United States Steel Co., Chicago, Ill., and its subsidiaries will have a joint exhibit, which will include a large scale model of a modern highway cloverleaf, the overpass roadway arching across the entrance or main highway which leads into the booth. In the booth, products will be displayed.

The Osgood Co., Marion, Ohio, will show their Model 800, its newest 1½-cu. yd. excavator, powered with either gas, oil, or Diesel and having a silent, fully enclosed chain drive running in oil.

T. L. Smith Co., Milwaukee, Wis., will exhibit a new 3-cu. yd. Smith-Mobile truck mixer and agitator. It features a large feed chute to take the place of the conventional loading hatch. Also included in the exhibit will be other mixers.

Universal Power Shovel Corp., Milwaukee, Wis., will include in its exhibit a newly designed ¾-cu. yd. excavator, known as the Unit 412. The one piece cast case which forms an important part of all Unit excavators also will be demonstrated.

General Excavator Co., Marion, Ohio, will present its Model 307, which is representative of the Type 30, a new line of ½-, ¾-, 1-cu. yd. machines for all classes of service.

Marion Steam Shovel Co., Marion, Ohio, is planning to show two Marion excavators, incorporating a number of decided improvements.

Austin-Western Road Machinery Co., Aurora, Ill., will exhibit among other machines, its "99" loader, "99" finisher, 4-44 tractor, and its 8-cu. yd. scraper.

Owen Bucket Co., Cleveland, Ohio, will display among other products a type K, 1-cu. yd. light alloy steel welded re-handling bucket and a ¾-cu. yd. type DX, extra heavy round nose bucket.

Link-Belt Co., Chicago, Ill., will include in its exhibit two new Link-Belt Speeder models, a "300" 1½-cu. yd. Speed-o-Matic shovel and an LS-60 Speeder with ½-cu. yd. dipper. All visitors are also invited to inspect the Chicago plants.

Cummins Engine Co., Columbus, Ind., will display various models of its Diesels, among which will be the new, lightweight 125 hp. supercharged model AAS-600 and the supercharged 200 hp. model HBS-600.

Hercules Motors Corp., Canton, Ohio, will display upwards of 25 Hercules engines and power units. Included will be two-, four-, and six-cylinder models of both gasoline and Diesel engines, a Diesel replacement engine for Ford trucks, the "Pancake" type Diesel and a new hand-cranking two-cylinder Diesel.

Lima Locomotive Works, Inc., Lima, Ohio, will exhibit a Paymaster ¾-cu. yd. convertible shovel, dragline, crane and pull-shovel and a type 750 shovel equipped with a dipper of 1½ cu. yd. capacity, a 22-ft. boom and a 17-ft. dipper handle.

Bethlehem Steel Co., Inc., Bethlehem, Penn., will exhibit accessories, wire rope and strand, and an operating model of a wire-rope machine and a stranding machine.

Cleveland Rock Drill Co., Cleveland, Ohio, will show a complete line of rock drills, paving breakers, diggers, tampers and accessories, as well as a Model DR-8 wagon drill.

Iowa Manufacturing Co., Cedar Rapids, Iowa, will display among other machines the "Kubit" impact breaker on skids, a new breaker for crushing aggregates which is designed to produce cubically-shaped particles. The machine is said to be a radical departure from existing hammermills, pulverizers, etc.

A. Leschen & Sons Rope Co., St. Louis, Mo., will display a complete assortment of samples of wire rope that are used on all types and kinds of road-building machines and equipment.

Blaw-Knox Co., Pittsburgh, Penn., will display a 2-cu. yd. truckmixer along with other equipment and will present photographically bulk cement plants, central mixing and truck-mixer loading plants.

Broderick & Bascom Rope Co., St. Louis, Mo., will feature a miniature wire rope strander.

Butler Bin Co., Waukesha, Wis., will feature the "cement hog" for unloading bulk cement from a box car, a bulk cement batching plant and an aggregate-weighing batcher.

Dempster Brothers, Inc., Knoxville, Tenn., will show its model 300 LF 3-cu. yd. Dempster-Dumpster mounted on a DR-50 International truck.

Koehring Co., Milwaukee, Wis., will display the complete group of Koehring hauling equipment, mixers and mud-jack.

Universal Crusher Co., Cedar Rapids, Iowa, plans to show a roller bearing

crusher, double roll crusher, welded steel plate roller bearing swing hammer pulverizer and pictures of other units.

Ransome Concrete Machinery Co., Dunnellen, N. J., will feature its latest streamlined 2½-cu. yd. truckmixer and a number of its other mixers.

Smith Engineering Works, Milwaukee, Wis., will show the new Telsmith inter-cone crusher and a miniature model crushing and screening plant.

Timken Roller Bearing Co., Canton, Ohio, will display Timken bearings as used in all types of construction equipment and Timken removable rock bits for various types of rock drilling and construction projects.

Bay City Shovels, Inc., Bay City, Mich., will exhibit three of its twelve sizes of convertible power shovels: Model 25½-cu. yd. trench-hoe or back digger, Model 45 ¾-cu. yd. heavy duty dragline and Model 65 high-lift 1½-cu. yd. shovel.

Caterpillar Tractor Co., Peoria, Ill., will show five sizes of its Diesel tractors fitted out with auxiliary equipment, and ten sizes of engines, nine of them Diesel.

Diamond Iron Works, Inc., Minneapolis, Minn., will exhibit for the first time the new design Diamond 10 x 24 full roller bearing jaw crusher. Other new equipment in crushers and screens also will be featured.

## New Incorporations

Concrete Products Co., Dubuque, Ia., has been incorporated with a capital of 100 shares no par value. U. S. Lewis, Jr., is president.

Continental Diatomite Corp., 134 S. La Salle Street, Chicago, Ill., has been incorporated with a capital of 2500 shares at \$10 per share. Incorporators are H. Clay Pollman, Max Frederick Goldberg, and A. Charles Lawrence.

Kuyper Builders Material Co., Pella, Ia., has been incorporated. Capital is \$10,000 and L. A. Kuyper is president.

Royal Stone Corp., Front Royal, Va., has been incorporated with a maximum capital of \$25,000. C. Merle Luck is president.

Southwestern Limestone Co., Lawton, Okla., has been incorporated with a capital stock of \$2000 by Andrew Crosby, E. H. Crosby, and Geo. A. Stephens.

Teton Phosphate Co., Inc., is the name of a new Utah corporation at Boise, to develop phosphate fields in southeastern Idaho. Capital is 50,000 shares common stock at par value of \$1.

Continental Diatomite Corp., 134 S. La Salle St., Chicago, Ill., has been granted a charter with a capital of 2500 shares par value at \$10 per share. Incorporators are H. Clay Pollman, Max Frederick Goldberg, and A. Charles Lawrence.

San Bernardino Lime & Stucco Co., San Bernardino, Calif., has filed articles of incorporation with capital of 2500 shares having a par value of \$25,000. Directors are Fred, Carl and Karma Bauer.

Columbia Sand & Gravel Co., Inc., is the name of a new Delaware corporation at Wilmington. Capital is \$500,000 in 500 shares par value and incorporators are L. H. Herman, Walter Lenz, and Howard K. Webb.

Golden West Quarry, Inc., San Francisco, Calif., has filed articles of incorporation with a capitalization of \$50,000.

Bridgeport Sand and Gravel Co., Bridgeport, Conn., has been incorporated by Adolph S. Grasso, Laura Gallucci and C. H. Grosson with a capital of \$50,000.

# HAZARD LAY-SET

... IS  
PRE-BROKEN-IN TO THE JOB

Pre-broken-in

● When you put Hazard LAY-SET Preformed on the job there is no need to "baby" it until it is "broken-in." Hazard LAY-SET Preformed is preformed at the mill—pre-trained to the job.

Take this single example for instance. Closing lines on some clamshell buckets must take terrific beatings because of small sheaves and reverse bending. It is in such places that LAY-SET Preformed proves its merit right from the start.

LAY-SET has the stamina to endure the punishment *much* longer than ordinary wire rope. That means fewer shutdowns, fewer rope replacements, steadier production, greater profits.

Write today to the Hazard district office nearest you and ask for the name of your nearby Hazard distributor. He will show you how to effect real economies in your machinery operation. All Hazard ropes made of Improved Plow Steel are identified by the Green Strand—and Green Signifies Safety.

## HAZARD WIRE ROPE DIVISION

*Established 1846*

AMERICAN CHAIN & CABLE COMPANY, INC.

WILKES-BARRE, PENNSYLVANIA

District Offices: New York, Chicago, Philadelphia,  
Pittsburgh, Fort Worth, San Francisco,  
Denver, Los Angeles, Atlanta, Tacoma

# Readership At The Right Times Increases Sales Value Of Your Advertising Message

**HERE IS THE  
RIGHT TIME**

**FEBRUARY  
CONVENTION  
REPORT NUMBER**

**I**NTEREST of plant operators everywhere in new developments and improved methods is greatest right after they have been at the industry's conventions. They have been examining manufacturers' equipment and have heard discussions of how problems have been solved by other producers.

Naturally their thoughts turn to the application of these solutions to their own problems. At this same time plant operators who were unable to attend are reading and rereading **ROCK PRODUCTS** with but one idea in their minds—What does The Industry's Recognized Authority say about the new developments and improved methods.

The February Convention Report Number is planned as carefully as the meetings themselves to assure maximum benefit for plant operators and equipment manufacturers. Because of this care it is certain to gain their attention and interest at the most strategic time—just when modernization plans are being formulated.

It is a timely and effective means of reaching all the worthwhile executives throughout the rock products industry. It is unquestionably the most powerful follow-up opportunity for the advertisers of machinery and equipment in this Annual Pictorial Review Number.

*Be sure the February Convention Report Number is on  
your 1940 schedule. Make your space reservations now.*

**Rock Products**

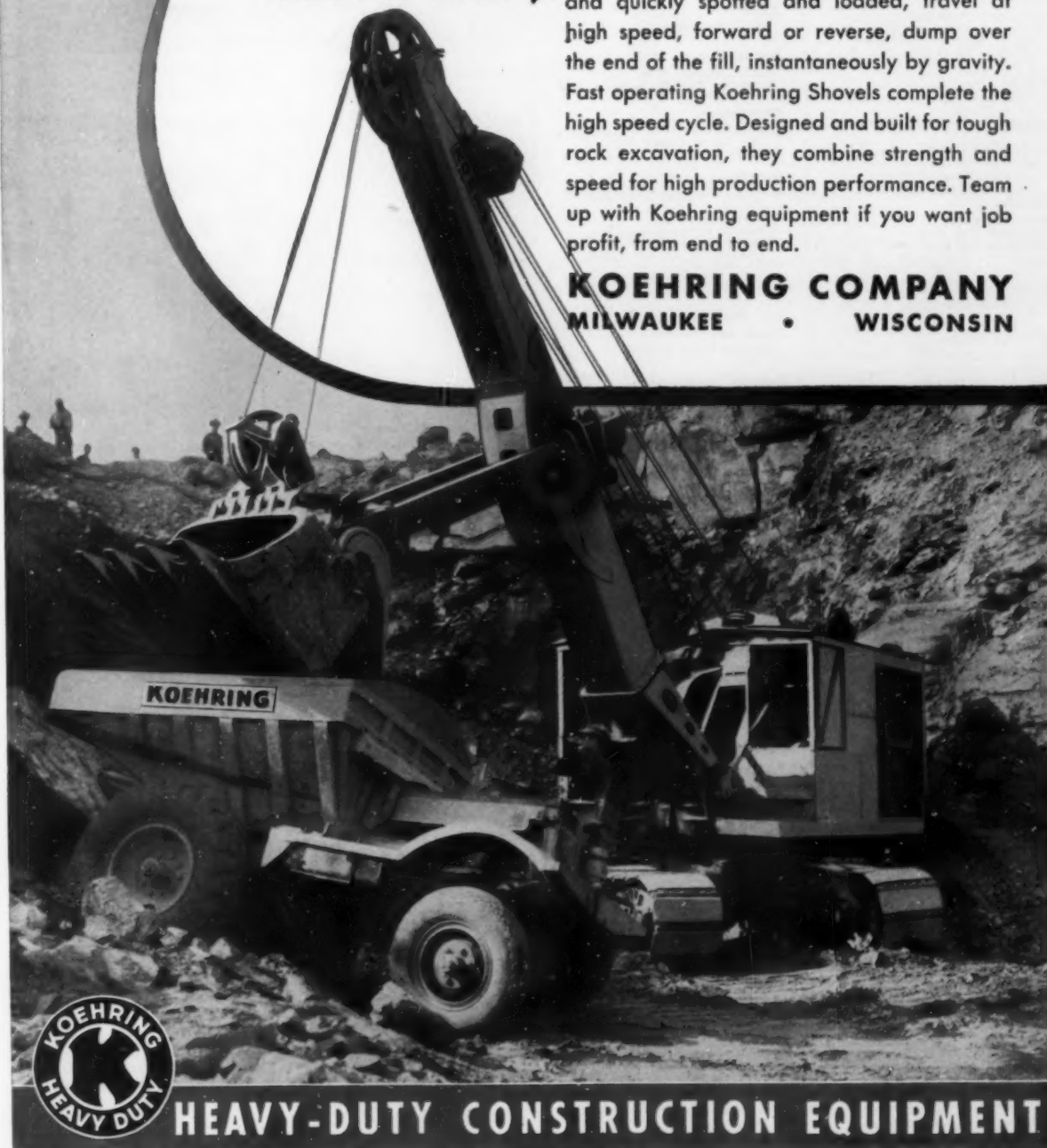
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Chicago, Ill.

# KOEHRING *Team-Work* FOR LOWER COSTS

Dig it fast ▶  
Load it fast ▶  
Haul it fast ▶

All three are necessary — if you want profit on your dirt or rock excavation job. Now you can have all three—with Koehring Dumpsters and Koehring Shovels. Dumpsters are easily and quickly spotted and loaded, travel at high speed, forward or reverse, dump over the end of the fill, instantaneously by gravity. Fast operating Koehring Shovels complete the high speed cycle. Designed and built for tough rock excavation, they combine strength and speed for high production performance. Team up with Koehring equipment if you want job profit, from end to end.

**KOEHRING COMPANY**  
MILWAUKEE • WISCONSIN



**HEAVY-DUTY CONSTRUCTION EQUIPMENT**

# Classified Directory of Advertisers

For alphabetical index see page 158

## Abrasion Resisting Plates

Frog, Switch & Mfg. Co.

## Abrasives

Parsons Engr. Corp.  
Wall-Colmonoy Corp.

## Aerial Tramways

American Cable Co.  
American Steel & Wire Co.  
(U. S. Steel Corp. Subs.)  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)  
Hazard Wire Rope Co.  
Jeffrey Mfg. Co.  
Leschen, A. & Sons Rope Co.  
Link-Belt Co.  
Roebbing's, John A. Sons Co.

## Aftercoolers (Air)

Ingersoll-Rand Co.  
Manitowoc Engineering Works

## Agitators

Blaw-Knox Co.  
Hardinge Co., Inc.  
Hetherington & Berner, Inc.  
Manitowoc Engineering Works  
Ransome Concrete Machinery  
Co. (Concrete)  
Smidth, F. L. & Co.  
Traylor Engineering & Mfg.  
Co.

## Air Compressors

Fuller Company  
Gardner-Denver Co.  
Ingersoll-Rand Co.  
Nordberg Mfg. Co.  
Smidth, F. L. & Co.  
Traylor Engr. & Mfg. Co.

## Air Filters

Blaw-Knox Co.  
Fuller Company  
Hardinge Co., Inc.  
Ingersoll-Rand Co.  
Roebbing's, John A. Sons Co.  
Sly, W. W., Mfg. Co.

## Air Heaters

Ingersoll-Rand Co.  
Parsons Engr. Corp.

## Air Separators

Blaw-Knox Co.  
Bradley Pulverizer Co.  
Combustion Engr. Corp.  
Gay, Robert M. Div.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Link-Belt Co.  
Parsons Engr. Corp.  
Raymond Pulv. Div.  
Smidth, F. L. & Co.  
Sly, W. W., Mfg. Co.  
Sturtevant Mill Co.  
Universal Road Machinery Co.  
Williams Patent Crusher &  
Pulv. Co.

## Alrveyors

Fuller Company

## Alloys (Metal)

Chicago Steel Foundry Co.  
Frog, Switch & Mfg. Co.  
Taylor-Wharton Iron & Steel  
Co.  
Wall-Colmonoy Corp.

## Arresters, Lightning

General Electric Co.

## Ash & Refuse Handling Equipment

Barber-Greene Co.  
Gründler Crusher &  
Pulverizer Co.  
Hetherington & Berner, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Taylor-Wharton Iron & Steel  
Co.

## Asphalt Mixer Regulators

Hetherington & Berner, Inc.

## Asphalt Mixing Plants

Hetherington & Berner, Inc.  
Iowa Mfg. Co.  
Koebling Co.  
Ransome Concrete Machinery  
Co.  
Traylor Engr. & Mfg. Co.

## Axles

Eagle Iron Works

## Rabbit Metal

Dixie Machy. Mfg. Co.  
Ryerson, Jos. T. & Sons, Inc.

## Backdiggers

Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Co.

## Backfillers

Austin-Western Road Machy.  
Co.  
Bucyrus-Erie Co.  
General Excavator Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Co.  
Marion Steam Shovel Co.  
Thew Shovel Co.

## Bag Cleaning Machines

Link-Belt Co.  
Modern Valve Bag Co.  
Parsons Engr. Corp.

## Bagging Machines

Modern Valve Bag Co.  
Smidth, F. L. & Co.

## Bag Ties

American Steel & Wire Co.  
(U. S. Steel Corp. Subs.)  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)  
Modern Valve Bag Co.

## Balers or Bundling Machines (Sack)

Besser Mfg. Co.

## Balls (Grinding)

Columbia Steel Co. (U. S.  
Steel Corp. Subs.)  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Smidth, F. L. & Co.  
Taylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.

## Bar and Angle Benders and Cutters

Ransome Concrete Mach. Co.

## Barges

Eagle Iron Works  
Manitowoc Engineering Works

## Batchers (Weighing and Measuring Volume)

Besser Mfg. Co.  
Blaw-Knox Co.  
Fuller Company  
Jaeger Machine Co.  
Ransome Concrete Machinery  
Co.  
Smith, T. L. Co.

## Battery Chargers

General Electric Co.

## Bearings (Anti-Friction)

Eagle Iron Works  
Hetherington & Berner, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Ryerson, Jos. T. & Sons, Inc.  
SKF Industries, Inc.  
Timken Roller Bearing Co.

## Bearing Metals

Robins Conveying Belt Co.

## Bearings (Ball)

SKF Industries, Inc.

## Bearings (Roller)

Link-Belt Co.  
Robins Conveying Belt Co.  
SKF Industries, Inc.  
Timken Roller Bearing Co.

## Bearings (Tapered Roller)

Link-Belt Co.  
Timken Roller Bearing Co.

## Bearings (Thrust)

SKF Industries, Inc.  
Timken Roller Bearing Co.

## Belt Fasteners or Hooks

Robins Conveying Belt Co.

## Belt Idlers

Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Smith Engr. Works

## Beltng (Conveyor & Elevator)

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Barber-Greene Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

## Beltng (Transmission)

Bacon, Earle C., Inc.  
Link-Belt Co.  
Smidth, F. L. & Co.

## Belt Tighteners

Link-Belt Co.  
Robins Conveying Belt Co.

## Belt Trippers

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

## Bin Gates

Austin-Western Road Machin-  
ery Co.  
Bacon, Earle C., Inc.  
Besser Mfg. Co.  
Blaw-Knox Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Fuller Company  
Gay, Robert M. Div.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Parsons Engr. Corp.  
Pioneer Engr. Works, Inc.  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.  
Smidth, F. L. & Co.  
Smith Engr. Works  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.

## Bins (Storage)

Austin-Western Road Machy.  
Co.  
Besser Mfg. Co.  
Blaw-Knox Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gay, Robert M. Div.  
Hetherington & Berner, Inc.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Parsons Engr. Corp.  
Robins Conveying Belt Co.  
Ransome Concrete Machinery  
Co.  
Smidth, F. L. & Co.  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.

## Bin Indicators

Fuller Company  
Merrick Scale Mfg. Co.

## Blasting Cap Crimpers

Ensign-Bickford Co.

## Blasting Caps (Electric)

Atlas Powder Co.  
Hercules Powder Co.

## Blasting Machines

Atlas Powder Co.  
Hercules Powder Co.

## Blasting Supplies

Atlas Powder Co.  
Ensign-Bickford Co.  
Hercules Powder Co.

## Block Machines, Building (Concrete)

Anchor Concrete Machinery  
Co.  
Besser Mfg. Co.  
Concrete Transport Mixer Co.  
Jackson & Church Co.  
Kent Machine Co.  
Multiplex Concrete Machy.  
Co.

## Block Racks

Kent Machine Co.

## Blocks (Pillow)

Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Manitowoc Engineering Works  
Robins Conveying Belt Co.  
SKF Industries, Inc.  
Timken Roller Bearing Co.

## Blocks (Sheave)

Link-Belt Co.  
Pioneer Engineering Works  
Roebbing's, John A. Sons  
Sauerman Bros., Inc.

## Blowers

Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Parsons Engr. Corp.  
Sly, W. W., Mfg. Co.

## Boats

Manitowoc Engineering Works

## Boats (Self-Unloading)

Link-Belt Co.  
Robins Conveying Belt Co.

## Rollers

Combustion Engineering Co.  
Manitowoc Engineering Works

## Bond Wire

American Steel & Wire Co.  
(U. S. Steel Corp. Subs.)  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)

## Brick Machines and Molds

Besser Mfg. Co.  
Jackson & Church Co.  
Multiplex Concrete Machy.  
Co.

## Buckets (Clamshell, Grab and Orange Peel)

Blaw-Knox Co.  
Bucyrus-Erie Co.  
Diamond Iron Works, Inc.  
Hayward Co.  
Jaeger Machine Co.  
Link-Belt Co.  
Manitowoc Engineering Works  
Robins Conveying Belt Co.  
Taylor-Wharton Iron & Steel  
Co.

## Buckets (Conveyor & Elevator)

Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Chicago Steel Foundry Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gründler Crusher &  
Pulverizer Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Parsons Engr. Corp.  
Pioneer Engineering Works  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Smidth, F. L. & Co.  
Smith Engineering Works  
Taylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.

## Buckets (Dragline & Shackline)

Austin-Western Road Machy.  
Co.  
Besser Mfg. Co.  
Blaw-Knox Co.  
Bucyrus-Erie Co.  
Diamond Iron Works, Inc.  
Gründler Crusher &  
Pulverizer Co.  
Hayward Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Link-Belt Co.  
Pioneer Engineering Works  
Sauerman Bros., Inc.  
Taylor-Wharton Iron & Steel  
Co.

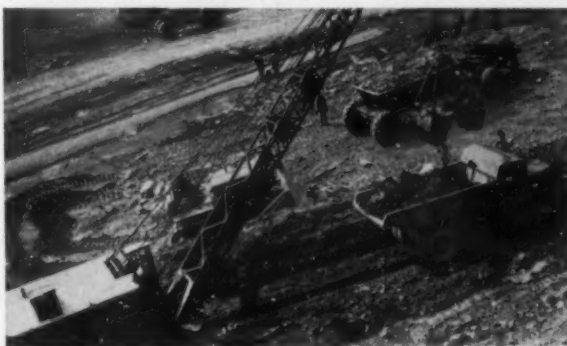
Contractors on world's greatest road-building project say:



The Empire Construction Company of New York and Baltimore has done the grading and excavating work on an important strip of the Turnpike—all equipment fueled and lubricated with Gulf products.



Bates and Rogers Construction Corp., of Chicago, are drilling the Kittatinny and Blue Mountain Tunnels—the only "twin" tunnels on the Turnpike. Gulf lubricants and fuels help avoid operating interruptions.



Guthrie-Marsch-Peterson Co. of Chicago have two excavating and grading jobs, and one tunnel to build on the Turnpike. Gulf lubricants and fuels are used for the wide variety of mechanical equipment in use.



The Arundel Corporation of Baltimore are drilling the Sideling Hill Tunnel, one mile in length. Shovels, trucks, compressors, drills, and other equipment are kept in efficient operation with Gulf products.

# "GULF QUALITY LUBRICANTS

help us move mountains  
at record speed!"

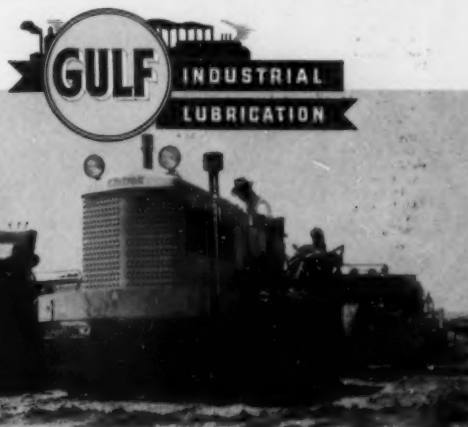
To insure efficient operation of their modern equipment, a majority of the contractors building the Pennsylvania Turnpike use **GULF'S HIGHER QUALITY LUBRICANTS AND FUELS.**

DESCRIBED as a "dream highway," the new Pennsylvania Turnpike, connecting Pittsburgh and Harrisburg, is the greatest road-building project of modern times. Seven tunnels will pierce the mountains to level out this road to no more than a three per cent grade at any point, and motorists will soon speed across this mountainous country on a four-lane ribbon of concrete.

Gulf's higher quality lubricants and fuels are in general use by leading contractors on this project. Operating men on the job rely upon the Gulf engineer to recommend proper application of oils and greases exactly suited to each piece of equipment and the conditions under which it works. These contractors report that all equipment has operated at peak efficiency and with lowest costs for maintenance. A few work scenes, showing equipment used by some of the contractors on this project, are shown on this page.

Ask the Gulf engineer to assist you in improving the lubrication and operation of your mechanical equipment. This cooperative service is available, without extra cost, in 30 states from Maine to Texas.

**GULF OIL CORPORATION ★ GULF REFINING COMPANY**  
Gulf Building, Pittsburgh, Pa.



Jacobson & McKinley, with their large fleet of Diesel tractors, are doing the scraper work for Connell & Laub on their three Turnpike jobs and for Herman Holmes on his section. Gulf lubricants and fuels are used.

# Classified Directory (Cont.)

## Buckets (Dredge & Excavator)

Blaw-Knox Co.  
Bucyrus-Erie Co.  
Hayward Co.  
Hendrick Mfg. Co.

## Buckets (Dump)

Dempster Bros., Inc.  
Jaeger Machine Co.

## Buckets (Tramway)

American Steel & Wire Co.  
(U. S. Steel Corp. Subs.)  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)

## Building Tile Machines

Besser Mfg. Co.  
Multiplex Concrete Machy.  
Co.

## Bulk Cement Storage Plants

Blaw-Knox Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Smidth, F. L., & Co.

## Bulldozers

Blaw-Knox Co.  
Bucyrus-Erie Co.  
Koehring Co.

## Bulldozers

Bucyrus-Erie Co.

## Bushings

Eagle Iron Works  
Jeffrey Mfg. Co.  
Link-Belt Co.

## Cable (Electric)

General Electric Co.

## Cableways

American Cable Co.  
American Steel & Wire Co.  
(U. S. Steel Corp. Subs.)  
Bucyrus-Erie Co.  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons, Rope Co.  
Link-Belt Co.  
Roebbling's, John A., Sons Co.  
Sauerman Bros., Inc.

## Calclining Equipment

Blaw-Knox Co.  
Bradley Pulverizer Co.  
Hardinge Co., Inc.  
Manitowoc Engineering Works  
Smidth, F. L., & Co.  
Traylor Engr. & Mfg. Co.

## Capacitors

General Electric Co.

## Capstans

Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

## Car Dumpers

Eagle Iron Works  
Link-Belt Co.  
Traylor Engr. & Mfg. Co.

## Car Pullers & Movers

Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

## Cars (Industrial, Quarry, Dump, Concrete, Block, etc.)

Austin-Western Road Machy.  
Co.  
Besser Mfg. Co.  
Columbia Steel Co. (U. S.  
Steel Corp. Subs.)  
Eagle Iron Works  
Link-Belt Co.  
Multiplex Concrete Machy.  
Co.  
Ransome Concrete Machinery  
Co.  
Traylor Engr. & Mfg. Co.

## Car Wheels

Eagle Iron Works  
Iowa Mfg. Co.  
Link-Belt Co.  
Taylor-Wharton Iron & Steel  
Co.

## Carts

Blaw-Knox Co.  
Jaeger Machine Co.  
Link-Belt Co.  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.

## Castings

Bacon, Earle C., Inc.  
Blaw-Knox Co.  
Chicago Steel Foundry Co.  
Diamond Iron Works, Inc.  
Dixie Machinery Mfg. Co.  
Eagle Iron Works  
Frog Switch & Mfg. Co.  
Hardinge Co., Inc.  
Hetherington & Berner, Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Kensington Steel Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Co.  
McLanahan & Stone Corp.  
Manitowoc Engineering Works  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Smidth, F. L., & Co.  
Taylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.  
Timken Roller Bearing Co.  
Wall-Colmonoy Corp.

## Cement Colors

Mepharm, Geo. S., Corp.

## Cement Plants

Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Smidth, F. L., & Co.  
Traylor Engr. & Mfg. Co.

## Cement Pumps

Fuller Co.  
Smidth, F. L., & Co.

## Central Mixing Plants (Concrete)

Blaw-Knox Co.  
Jaeger Machine Co.

## Chain (Conveyor & Elevator)

Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Gruendler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Taylor-Wharton Iron & Steel  
Co.

## Chain (Dredge & Shovel)

Bucyrus-Erie Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Kensington Steel Co.  
Link-Belt Co.  
Taylor-Wharton Iron & Steel  
Co.

## Channeling Machines

Ingersoll-Rand Co.

## Chimney Block Machines & Molds

Besser Co.  
Multiplex Concrete Machy.  
Co.

## Chutes (Bin, Concrete, etc.)

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Blaw-Knox Co.  
Concrete Transport Mixer Co.  
Cross Engineering Co.  
Eagle Iron Works  
Fuller Co.  
Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Parsons Engr. Corp.  
Pioneer Engineering Works  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.  
Ross Screen & Feeder Co.  
Smidth, F. L., & Co.  
Taylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.

## Chute Liners

Bacon, Earle C., Inc.  
Cross Engineering Co.  
Frog Switch & Mfg. Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Robins Conveying Belt Co.  
Smidth, F. L., & Co.  
Taylor-Wharton Iron & Steel  
Co.

## Circuit Breakers

General Electric Co.

## Circuit Testers

Atlas Powder Co.  
General Electric Co.  
Hercules Powder Co.

## Classifiers

Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.

## Classifiers

Blaw-Knox Co.  
Bradley Pulverizer Co.  
Eagle Iron Works  
Hardinge Co., Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Machy.  
Co.  
Link-Belt Co.  
Nordberg Mfg. Co.  
Parsons Engr. Corp.  
Pioneer Engineering Works.  
Inc.  
Raymond Pulverizer Div.  
Rogers Iron Works Co.  
Simplicity Engineering Co.  
Sly, W. W., Mfg. Co.  
Smidth, F. L., & Co.  
Traylor Engr. & Mfg. Co.  
Universal Vibrating Screen  
Co.  
Williams Patent Crusher &  
Pulv. Co.

## Clutches

Diamond Iron Works, Inc.  
Gruendler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.

## Coal Pulverizing Equipment

Austin-Western Road Machy.  
Co.  
Bradley Pulverizer Co.  
Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Pennsylvania Crusher Co.  
Raymond Pulverizer Div.  
Smidth, F. L., & Co.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Concrete Mixers

Anchor Concrete Machy. Co.  
Besser Mfg. Co.  
Blaw-Knox Co.  
Concrete Transport Mixer Co.  
Gruendler Crusher &  
Pulverizer Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Kent Machine Co.  
Koehring Co.  
Multiplex Concrete Machy.  
Co.  
Ransome Concrete Machinery  
Co.  
Smith, T. L., Co.

## Controllers (Electric)

General Electric Co.

## Converters (Electric)

General Electric Co.

## Conveyor Idlers & Rolls

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Barber-Greene Co.  
Diamond Iron Works, Inc.  
Gruendler Crusher &  
Pulverizer Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Parsons Engr. Corp.  
Pioneer Engr. Works, Inc.  
Robins Conveying Belt Co.  
Smidth, F. L., & Co.

## Conveyors (Apron)

Barber-Greene Co.  
Gruendler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Traylor Engr. & Mfg. Co.

## Conveyors (Belt)

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Barber-Greene Co.  
Besser Mfg. Co.  
Chicago Steel Foundry Co.

Diamond Iron Works, Inc.  
Fuller Co.  
Gay, Robert M. Div.  
Gruendler Crusher &  
Pulverizer Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Multiplex Concrete Machy.  
Co.  
Parsons Engr. Corp.  
Pioneer Engineering Works.  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Smidth, F. L., Co.  
Smith Engineering Works  
Sturtevant Mill Co.  
Traylor Engineering & Mfg.  
Co.  
Universal Road Machinery Co.  
Williams Patent Crusher &  
Pulv. Co.

## Conveyors (Drag-Chain)

Diamond Iron Works, Inc.  
Gruendler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.

## Conveyors (Fan)

Jeffrey Mfg. Co.  
Link-Belt Co.

## Conveyors (Pneumatic)

Fuller Co.  
Gruendler Crusher &  
Pulverizer Co.  
Parsons Engr. Corp.  
Raymond Pulverizer Div.

## Conveyors (Portable)

Austin-Western Road Machy.  
Co.  
Barber-Greene Co.  
Diamond Iron Works, Inc.  
Fuller Co.  
Gruendler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Pioneer Engineering Works.  
Inc.  
Robins Conveying Belt Co.

## Conveyors (Screw)

Besser Mfg. Co.  
Eagle Iron Works  
Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.

## Conveyors (Trolley)

Jeffrey Mfg. Co.  
Link-Belt Co.

## Conveyors (Vibrating)

Jeffrey Mfg. Co.  
Link-Belt Co.  
Smidth, F. L., & Co.

## Coolers

Blaw-Knox Co.  
Fuller Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Manitowoc Engineering Works  
Smidth, F. L., & Co.  
Traylor Engr. & Mfg. Co.

## Correcting Basins

Smidth, F. L., & Co.

## Couplings (Flexible & Shaft)

Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

## Cranes (Diesel, Electric, Gasoline, Steam)

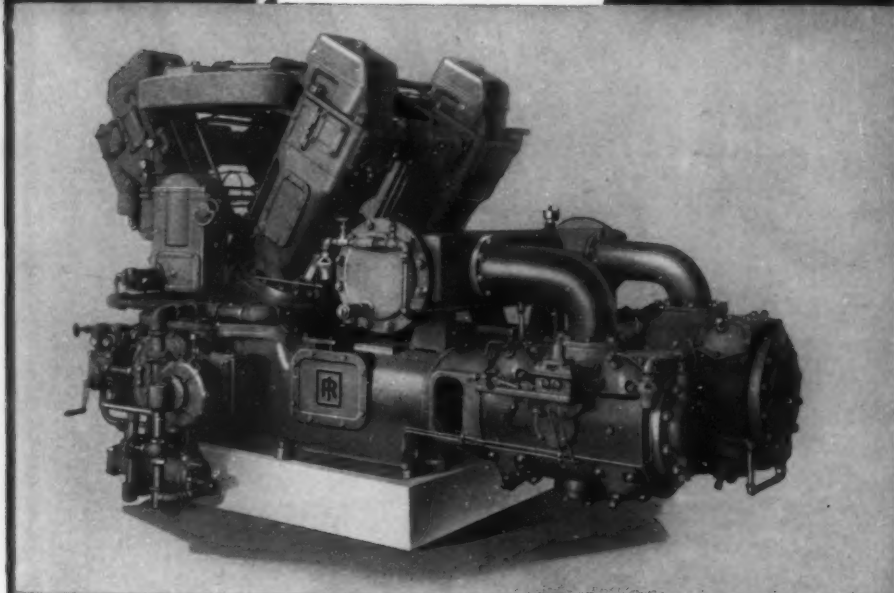
Austin-Western Road Machy.  
Co.  
Bucyrus-Erie Co.  
General Excavator Co.  
Koehring Co.  
Lima Locomotive Works,  
Inc. (Shovel & Crane Div.)  
Link-Belt Speeder Corp.  
Manitowoc Engineering Works  
Marion Steam Shovel Co.  
Northwest Engineering Co.  
Thew Shovel Co.

## Cranes (Tractor)

Austin-Western Road Machy.  
Co.  
Bucyrus-Erie Co.  
Koehring Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Speeder Corp.

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IS ECONOMY

THAT'S JUST WHY  
I PICK THE NEW XVO



When economy dictates the use of Diesel power for compressing air or gas, the same reason demands the selection of the most economical Diesel-engine-driven compressor on the market.

Economy is built into Ingersoll-Rand's new XVO. Using Diesel oil costing 6 cents per gallon, the XVO will compress 1000 cubic feet of free air to 100 pounds pressure for a fuel cost of slightly over 1¢. Similar economies are obtained when compressing air or gas to other pressures.

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Newark  
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# Type XVO DIESEL-ENGINE-DRIVEN COMPRESSOR

The XVO combines a heavy-duty, four-cycle Diesel engine and a horizontal heavy-duty, double-acting compressor in a single, compact and comparatively light-weight unit.

Sizes are available with 4, 6 or 8 power cylinders. For 100-lb. compression these sizes are rated at 625, 935 and 1250 cfm. actual free-air capacity.

The XVO is conservatively rated for 24 hours-a-day full-load service. Rotative speeds and piston speeds are considerably lower than those of other units offered for similar service.

The arrangement of two V-type power cylinders for each compressor crosshead results in smooth operation and an important reduction in foundation requirements.

The fuel and combustion systems are the same as those of the famous and thoroughly proved Ingersoll-Rand Type S Diesel engine.

The XVO has the same frame, running gear and compressor used by the popular I-R gas-engine-driven XVG compressor, of which there are more than 125,000 installed horsepower.

Compressor cylinders can be furnished for vacuums, for pressures up to 5000 lb. per sq. in., and for air, gas or ammonia compression.

A new bulletin describing in detail the money-saving features of the XVO has just been printed. Ask for Form 3072.

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**A**RE you going to be *there* and know what you're talking about? Are you going to know the latest  
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—in methods?  
—in materials?

Today the flow of improvement and change is rapid. Whether you are a contractor or highway official, you need every advantage to meet the contingencies of your job. You've got to keep up to date. Here is the one big chance to see, to learn, to examine in detail the latest in methods, machinery and materials—the one big chance to bring yourself up to date.

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# Classified Directory (Cont.)

## Cranes (Truck)

Link-Belt Speeder Corp.  
Thew Shovel Co.

## Crawler Attachments

Link-Belt Co.

## Crawling Tractor Excavators

Austin-Western Road Machy.  
Co.  
General Excavator Co.  
Koehring Co.  
Link-Belt Co.  
Thew Shovel Co.

## Crusher Parts

American Pulverizer Co.  
Bacon, Earle C., Inc.  
Dixie Machinery Mfg. Co.  
Eagle Iron Works  
Frog, Switch & Mfg. Co.  
Gründler Crusher &  
Pulverizer Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
McLanahan & Stone Corp.  
Pennsylvania Crusher Co.  
Pioneer Engr. Works, Inc.  
Rogers Iron Works Co.  
Traylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.

## Crushers (Cone)

Nordberg Mfg. Co.

## Crushers (Hammer)

American Pulverizer Co.  
Austin-Western Road Machy.  
Co.  
Bradley Pulverizer Co.  
Brooks Equipment & Mfg. Co.  
Dixie Machinery Mfg. Co.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Pennsylvania Crusher Co.  
Sturtevant Mill Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushers (Jaw & Gyratory)

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Dixie Machinery Mfg. Co.  
Gay, Robert M. Div.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach. Co.  
McLanahan & Stone Corp.  
Nordberg Mfg. Co.  
Pennsylvania Crusher Co.  
Pioneer Engineering Works,  
Inc.  
Smith Engineering Works  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.

## Crushers (Laboratory)

American Pulverizer Co.  
Bacon, Earle C., Inc.  
Dixie Machinery Mfg. Co.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Pennsylvania Crusher Co.  
Rogers Iron Works Co.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushers (Primary Breakers)

McLanahan & Stone Corp.  
Rogers Iron Works Co.  
Smith Engineering Works  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushers Reduction

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
McLanahan & Stone Corp.  
Rogers Iron Works Co.  
Smith Engineering Works  
Traylor Engr. & Mfg. Co.

## Crushers (Ring)

American Pulverizer Co.  
Dixie Machinery Mfg. Co.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushers (Roll)

American Pulverizer Co.  
Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Besser Mfg. Co.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pennsylvania Crusher Co.  
Pioneer Engr. Works, Inc.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Smith Engineering Works  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushing Rolls

Austin-Western Road Machy.  
Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gründler Crusher &  
Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pennsylvania Crusher Co.  
Pioneer Engineering Works,  
Inc.  
Rogers Iron Works Co.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Crushing & Screening Plants (Portable)

American Pulverizer Co.  
Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Barber-Greene Co.  
Blaw-Knox Co.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Dixie Machy. Mfg. Co.  
Eagle Iron Works  
Gründler Crusher &  
Pulverizer Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pennsylvania Crusher Co.  
Pioneer Engr. Works, Inc.  
Smith Engr. Works  
Traylor Engr. & Mfg. Co.  
Universal Vibrating Screen  
Co.  
Williams Patent Crusher &  
Pulv. Co.

## Curing Racks

Besser Mfg. Co.  
Multiplex Concrete Machy.  
Co.

## Dedusters

Blaw-Knox Co.

## Dehydrators

Pioneer Engineering Works,  
Inc.

## Derricks

Hayward Co.  
Manitowoc Engineering Works

## Detonators

Atlas Powder Co.  
Ensign-Bickford Co.  
Hercules Powder Co.

## Dewatering Equipment

Diamond Iron Works, Inc.  
Eagle Iron Works  
Hardinge Co., Inc.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Rogers Iron Works Co.

## Diaphragms (Rubber)

Jaeger Machine Co.

## Dippers & Teeth (Dredge & Shovel)

Bucyrus-Erie Co.  
Frog, Switch & Mfg. Co.  
General Excavator Co.  
Kensington Steel Co.  
Koehring Co.  
Link-Belt Co.  
Marion Steam Shovel Co.  
Taylor-Wharton Iron & Steel  
Co.  
Thew Shovel Co.

## Disintegrators

Smidth, F. L., & Co.

## Ditchers

Barber-Greene Co.  
Bucyrus-Erie Co.  
Link-Belt Co.  
Marion Steam Shovel Co.

## Dragline & Cableway Excavators

American Cable Co.  
American Steel & Wire Co.  
(U. S. Steel Corp. Subal.)  
Austin-Western Road Machy.  
Co.  
Blaw-Knox Co.  
Bucyrus-Erie Co.  
Columbia Steel Co. (U. S.  
Steel Corp. Subal.)  
Diamond Iron Works, Inc.  
General Excavator Co.  
Hazard Wire Rope Co.  
Koehring Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Speeder Corp.  
Marion Steam Shovel Co.  
Northwest Engineering Co.  
Pioneer Engr. Works, Inc.  
Sauerman Bros., Inc.  
Thew Shovel Co.

## Dredge Cutter Heads & Ladders

Bucyrus-Erie Co.  
Eagle Iron Works  
Hetherington & Berner, Inc.

## Dredge Halls

Eagle Iron Works  
Manitowoc Engineering Works

## Dredges

Bucyrus-Erie Co.  
Eagle Iron Works  
Hayward Co.  
Hetherington & Berner, Inc.  
Link-Belt Co.  
Manitowoc Engineering Works  
Marion Steam Shovel Co.

## Dredge Sleeves

Hetherington & Berner, Inc.

## Drill Bits

Bucyrus-Erie Co.  
Ingersoll-Rand Co.  
Timken Roller Bearing Co.

## Drill Sharpening Machines

Bucyrus-Erie Co.  
Gardner-Denver Co.  
Ingersoll-Rand Co.

## Drill Steel

Gardner-Denver Co.  
Ingersoll-Rand Co.

## Drill Steel Heat Treating Machines

Ingersoll-Rand Co.

## Drilling Accessories

Bucyrus-Erie Co.  
Gardner-Denver Co.  
Ingersoll-Rand Co.  
Timken Roller Bearing Co.

## Drills (Blast Hole)

Bucyrus-Erie Co.  
Gardner-Denver Co.  
Ingersoll-Rand Co.

## Drills (Hand Hammer)

Gardner-Denver Co.  
Ingersoll-Rand Co.

## Drills (Rock)

Bucyrus-Erie Co.  
Gardner-Denver Co.  
Ingersoll-Rand Co.  
Jeffrey Mfg. Co.  
Timken Roller Bearing Co.

## Drills (Tripod)

Ingersoll-Rand Co.

## Drills (Wagon)

Gardner-Denver Co.  
Ingersoll-Rand Co.

## Drills (Well)

Bucyrus-Erie Co.

## Drives (Belt, Chain & Rope)

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Rogers Iron Works Co.  
Smidth, F. L., & Co.

## Drives (Short-Center)

Bacon, Earle C., Inc.  
Link-Belt Co.  
Smidth, F. L., & Co.

## Drives (Worm)

Link-Belt Co.

## Dryers

Blaw-Knox Co.  
Combustion Engr. Co.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hetherington & Berner, Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Manitowoc Engineering Works  
Raymond Pulverizer Div.  
Smidth, F. L., & Co.  
Traylor Engr. & Mfg. Co.  
Tyler, W. W., Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.

## Dust Arrestors

Blaw-Knox Co.  
Parsons Engr. Corp.

## Dust Collecting Systems

Blaw-Knox Co.  
Buell Engineering Co., Inc.  
Hendrick Mfg. Co.  
Parsons Engr. Corp.  
Raymond Pulverizing Div  
Sly, W. W., Mfg. Co.  
Smidth, F. L., & Co.  
Sturtevant Mill Co.

## Dust Collecting Bags

Blaw-Knox Co.  
Parsons Engr. Corp.  
Sly, W. W., Mfg. Co.

## Dust Conveying Systems

Blaw-Knox Co.  
Fuller Co.  
Parsons Engr. Corp.  
Raymond Pulverizer Div.  
Sly, W. W., Mfg. Co.

## Dust Recovery Plants

Parsons Engr. Corp.  
Sly, W. W., Mfg. Co.

## Dynamite

Atlas Powder Co.  
Hercules Powder Co.

## Electric Cables

General Electric Co.

## Electric Motors

General Electric Co.  
Hayward Co.

## Electric Motor Starters

General Electric Co.

## Elevators

Austin-Western Road Machy.  
Co.  
Bacon, Earle C., Inc.  
Barber-Greene Co.  
Besser Mfg. Co.  
Chicago Steel Fdry. Co.  
Cross Engineering Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Fuller Co.  
Gay, Robert M. Div.  
Gründler Crusher &  
Pulverizer Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Kent Machine Co.  
Lewistown Fdry. & Mach. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Multiplex Concrete Machy.  
Co.  
Pioneer Engineering Works,  
Inc.  
Ransome Concrete Machinery  
Co.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Smidth, F. L., & Co.  
Smith Engineering Works  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.  
Williams Patent Crusher &  
Pulv. Co.

## Engineers (Designing & Consulting)

Bacon, Earle C., Inc.  
Blaw-Knox Co.  
Bradley Pulverizer Co.  
Fuller Co.  
Gründler Crusher &  
Pulverizer Co.  
Hetherington & Berner, Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Merrick Scale Mfg. Co.  
Robins Conveying Belt Co.  
Smidth, F. L., & Co.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher &  
Pulv. Co.



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HOTEL JEFFERSON

NATIONAL SAND AND GRAVEL ASSOCIATION  
and the  
NATIONAL READY MIXED CONCRETE ASSOCIATION  
*January 17, 18 and 19, 1940*

♦ ♦ ♦

NATIONAL CRUSHED STONE ASSOCIATION  
*January 22, 23 and 24, 1940*

All producers, irrespective of Association membership, are invited to attend, to participate in the proceedings, and take advantage of the educational features which the programs and the expositions afford. Don't miss the round-table discussions of the industry's problems.

*Everyone Invited*  
*Be there! Everybody Else Will!*

## Classified Directory (Cont.)

### Engines (Diesel, Gas, Kerosene & Oil)

Caterpillar Tractor Co.  
Ingersoll-Rand Co.  
Iowa Mfg. Co.  
Nordberg Mfg. Co.

### Engines (Steam)

Ingersoll-Rand Co.  
Nordberg Mfg. Co.

### Exhausters

Combustion Engr. Co.  
Parsons Engr. Corp.  
Raymond Pulverizer Div.

### Explosives

Atlas Powder Co.  
Hercules Powder Co.

### Fans

Blaw-Knox Co.  
General Electric Co.  
Gruendler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co.  
Parsons Engr. Corp.  
Sly, W. W., Mfg. Co.  
Smidth, F. L., & Co.

### Feeders

Bacon, Earle C., Inc.  
Barber-Greene Co.  
Beuser Mfg. Co.  
Bradley Pulverizer Co.  
Kent Machine Co.  
Blaw-Knox Co.  
Diamond Iron Works, Inc.  
Fuller Co.  
Gay, Robert M. Div.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Hetherington & Berner, Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Merrick Scale Mfg. Co.  
Pennsylvania Crusher Co.  
Pioneer Engr. Works, Inc.  
Robins Conveying Belt Co.  
Ross Screen & Feeder Co.

Schaffer Poldometer Co.  
Smidth, F. L., & Co.  
Smith Engineering Works  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.

### Filter Cloth

Parsons Engr. Corp.  
Roebblings, John A., Sons Co.  
Tyler, W. S., Co.

### Finished Cement Grinding Aid

Dewey & Almy Chemical Co.

### Forges

Gardner-Denver Co.

### Forgings

Bacon, Earle C., Inc.  
Taylor-Wharton Iron & Steel Co.

### Frogs & Switches

Frog, Switch & Mfg. Co.  
Taylor-Wharton Iron & Steel Co.

### Fuels (Diesel)

Texas Co.

### Furnaces (Heat Treating, Electric)

General Electric Co.

### Fuse Cutouts

General Electric Co.

### Fuse Cutters

Ensign-Bickford Co.

### Fuse Lighters

Ensign-Bickford Co.

### Fuses (Detonating & Safety)

Atlas Powder Co.  
Ensign-Bickford Co.  
Hercules Powder Co.

### Fuses (Electric)

General Electric Co.

### Galvanometers

Atlas Powder Co.  
General Electric Co.  
Hercules Powder Co.

### Gasoline

Gulf Refining Co.  
Texas Co.

### Gas Producers

Blaw-Knox Co.

### Gear-Motors

General Electric Co.  
Link-Belt Co.

### Gears

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Frog, Switch & Mfg. Co.  
General Electric Co.  
Jeffrey Mfg. Co.  
Kensington Steel Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Taylor-Wharton Iron & Steel Co.  
Traylor Engr. & Mfg. Co.

### Generators & Motor Generator Sets

General Electric Co.  
Ingersoll-Rand Co.  
Nordberg Mfg. Co.

### Glass Sand Equipment

Lewistown Fdry. & Mach. Co.

### Gloves

Sly, W. W., Mfg. Co.

### Grapples

Blaw-Knox Co.  
Bucyrus-Erie Co.  
Hayward Co.  
Owen Bucket Co.

### Gratings

Blaw-Knox Co.  
Eagle Iron Works  
Hendrick Mfg. Co.

### Grease

Bacon, Earle C., Inc.  
Gulf Refining Co.  
Texas Co.

### Grease Cups

Link-Belt Co.  
Robins Conveying Belt Co.

### Guards (Machinery)

Harrington & King Perf. Co.  
Hendrick Mfg. Co.  
Tyler, W. S., Co.

### Guns

Hetherington & Berner, Inc.

### Gypsum Plants

Gruendler Crusher & Pulverizer Co.  
Traylor Engr. & Mfg. Co.

### Hangers, Anchors & Inserts (Concrete)

Jeffrey Mfg. Co.  
Link-Belt Co.

### Haulage Systems (Electric)

General Electric Co.  
Jeffrey Mfg. Co.

### Haulage Systems (Remote Control)

Dempster Bros.  
General Electric Co.  
Koehring Co.

### Helmets

Parsons Engr. Corp.  
Sly, W. W., Mfg. Co.

### Hoists (Chain, Electric, Ship, Portable, Air, etc.)

Beuser Mfg. Co.  
Commercial Shearing & Stamping Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gardner-Denver Co.  
Gay, Robert M. Div.  
Gruendler Crusher & Pulverizer Co.  
Hetherington & Berner, Inc.  
Ingersoll-Rand Co.  
Iowa Mfg. Co.  
Jaeger Machine Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Nordberg Mfg. Co.  
Northwest Engineering Co.  
Pioneer Engr. Works, Inc.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Sauerman Bros., Inc.  
Smith Engineering Works  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.

# MORE POWER... with Shay Geared Locomotives



Shay Geared Locomotives are equipped with three cylinder engines geared by a flexible drive to each pair of wheels. Every wheel is a driver. Pulling power is greater than for any other locomotive of equal weight.

Because of this great power, Shay Geared Locomotives will haul heavy loads at higher speeds, thus keeping production up and transportation costs low.

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LIMA, OHIO

Sales Office: 60 E. 42nd St., New York, N. Y.

**Join the Profit Parade in  
1940 with  
TRANSPORT MIXERS  
Proven Performance**



Open top—easy to load, visible blade mixing, while loading, easy to clean.

Rugged construction—fast discharge, side and rear.

Lowest first cost—lowest operating cost.

Highest quality concrete, mortar, and plaster.

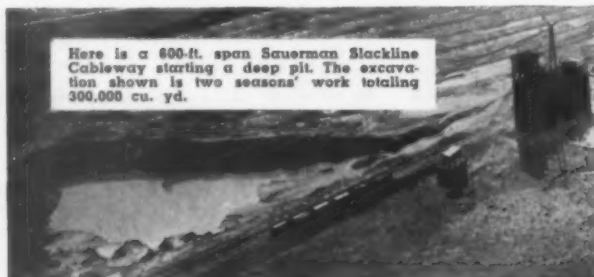
Truck or plant mixers.

Write for Complete Details and Test Reports

**CONCRETE TRANSPORT MIXER COMPANY**

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ST. LOUIS, MO.



Here is a 600-ft. span Sauerman Slackline Cableway starting a deep pit. The excavation shown is two seasons' work totaling 300,000 cu. yd.

**DIG, HAUL & DUMP**

... at lowest cost

Whether your problem is to dig gravel or to convey rock from quarry to crusher, or to stockpile and reclaim your surplus products—there is a size and type of Sauerman Cableway or Sauerman Scraper to meet your needs. Put your problem up to us and we will save you money. Write for Catalog.

**SAUERMAN BROS., INC.**

430 S. Clinton St.

Chicago



Drag Scraper Storage Unit



Slackline Cableway Excavator



Slackline Scraper Excavator

**SAUERMAN**  
LONG RANGE MACHINES

**Classified Directory (Cont.)**

**Hoppers**

Austin-Western Road Machy.

Co.

Besser Mfg. Co.

Blaw-Knox Co.

Gay, Robert M. Div.

Gruendler Crusher &

Pulverizer Co.

Hardinge Co., Inc.

Hendrick Mfg. Co.

Jaeger Machine Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Merrick Scale Mfg. Co.

Parsons Engr. Corp.

Pioneer Engr. Wks., Inc.

Ransome Concrete Machinery

Co.

Robins Conveying Belt Co.

Traylor Engr. & Mfg. Co.

Universal Road Machinery Co.

**Hose (Air, Drill, Water, Steam,**

**Sand Suction & Discharge)**

Dixie Machinery Co.

Hetherington & Berner, Inc.

Ingersoll-Rand Co.

Jaeger Machine Co.

Sly, W. W., Mfg. Co.

**Hose (Sand Blast)**

Parsons Engr. Corp.

Sly, W. W., Mfg. Co.

**Hose Clamps**

Ingersoll-Rand Co.

**Hose Couplings**

Ingersoll-Rand Co.

Manitowoc Engineering Works

**Hydrators**

Blaw-Knox Co.

Hardinge Co., Inc.

Traylor Engr. & Mfg. Co.

**Jigs (Sand & Gravel)**

Hardinge Co., Inc.

Traylor Engr. & Mfg. Co.

**Joists & Slab Machines**

(Concrete)

Besser Mfg. Co.

**Kiln Burners**

Smidth, F. L., & Co.

**Kiln Chain Systems**

Smidth, F. L., & Co.

**Kiln Liners**

Hardinge Co., Inc.

Traylor Engr. & Mfg. Co.

**Kiln Parts**

Blaw-Knox Co.

Chicago Steel Foundry Co.

Hardinge Co., Inc.

Manitowoc Engineering Works

Smidth, F. L., & Co.

Traylor Engr. & Mfg. Co.

**Kilns (Rotary)**

Blaw-Knox Co.

Hardinge Co., Inc.

Manitowoc Engineering Works

Smidth, F. L., & Co.

Traylor Engineering & Mfg.

Co.

**Kilns (Shaft)**

Hardinge Co., Inc.

**Kilns (Vertical)**

Blaw-Knox Co.

Hardinge Co., Inc.

**Kominuters**

Smidth, F. L., & Co.

**Laboratory Apparatus**

Ransome Concrete Machinery

Co.

Smidth, F. L., & Co.

**Lift Trucks**

Besser Mfg. Co.

**Lime Handling Equipment**

Combustion Engr. Corp.

Fuller Co.

Hardinge Co., Inc.

Iowa Mfg. Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Raymond Pulv. Div.

Robins Conveying Belt Co.

Traylor Engr. & Mfg. Co.

**Lime Plants**

American Pulv. Co.

Blaw-Knox Co.

Gruendler Crusher &

Pulverizer Co.

Hardinge Co., Inc.

Manitowoc Engineering Works

Smidth, F. L., & Co.

Traylor Engr. & Mfg. Co.

**Loaders (Boat)**

Fuller Co.

Link-Belt Co.

**Loaders (Box Car)**

Barber-Greene Co.

Diamond Iron Works, Inc.

Gruendler Crusher &

Pulverizer Co.

Jeffrey Mfg. Co.

Link-Belt Co.

**Loaders (Car, Truck, Bin &**

**Hopper)**

Barber-Greene Co.

Besser Mfg. Co.

Bucyrus-Erie Co.

Diamond Iron Works, Inc.

Fuller Co.

Gardner-Denver Co.

Gay, Robert M. Div.

Gruendler Crusher &

Pulverizer Co.

Jeffrey Mfg. Co.

Link-Belt Co.

Marion Steam Shovel Co.

Northwest Engineering Co.

Robins Conveying Belt Co.

Ross Screen & Feeder Co.

Universal Road Machinery Co.

**Loaders (Underground)**

Bucyrus-Erie Co.

Diamond Iron Works, Inc.

Jeffrey Mfg. Co.

Nordberg Mfg. Co.

Thew Shovel Co.

**Locomotive Stack Netting**

Tyler W. S., Co.

**Locomotives (Diesel-Electric)**

Fate-Root-Heath Co.

Lima Locomotive Works

(Loco. Div.)

Plymouth Locomotive Works

**Locomotives (Electric, Trolley**

**& Storage Battery)**

General Electric Co.

Jeffrey Mfg. Co.

Lima Locomotive Works, Inc.

(Loco. Div.)

**Locomotives (Gasoline & Gas-**

**Electric)**

Fate-Root-Heath Co.

General Electric Co.

Jeffrey Mfg. Co.

Lima Locomotive Wks., Inc.

(Loco. Div.)

Plymouth Locomotive Works

**Locomotives (Kerosene)**

Lima Locomotive Works, Inc.

(Loco. Div.)

**Locomotives (Oil & Oil-**

**Electric)**

Fate-Root-Heath Co.

General Electric Co.

Plymouth Locomotive Works

**Locomotives (Steam)**

Lima Locomotive Works, Inc.

(Loco. Div.)

**Lubricants**

Bacon, Earle C., Inc.

Gulf Refining Co.

Robins Conveying Belt Co.

Texas Co.

**Machine Shop Equipment**

Ingersoll-Rand Co.

Robins Conveying Belt Co.

Smidth, F. L., & Co.

Traylor Engr. & Mfg. Co.

**Magnetic Separators**

Diamond Iron Works, Inc.

Jeffrey Mfg. Co.

Link-Belt Co.

Parsons Engr. Corp.

Robins Conveying Belt Co.

**Magnets**

General Electric Co.

**Manganese Steel Parts**

Bacon, Earle C., Inc.

Dixie Machy. Mfg. Co.

Frog, Switch & Mfg. Co.

Kensington Steel Co.

Taylor-Wharton Iron & Steel

Co.

**Material Handling Equipment**

Austin-Western Rd. Machy.

Co.

Barber-Greene Co.

Diamond Iron Works, Inc.

Fuller Co.

Gruendler Crusher &

Pulverizer Co.

Hardinge Co., Inc.

Jeffrey Mfg. Co.

Link-Belt Co.

Raymond Pulv. Div.

Robins Conveying Belt Co.

# DEMPSTER DUMPSTER

*The All-Purpose Detachable Bucket  
Makes One Truck do the Work of a Fleet*



LOADING



HAULING



DUMPING

Visit our Booth, M-10, at the Road Show, Chicago, Jan. 29-Feb. 2, and see one of the newest and latest developments in truck hauling units.

DEMPSTER-DUMPSTERS are now built in a variety of sizes with different types of buckets for handling every kind of material from sand to rock, and from mixed concrete to liquids. They are furnished in capacities up to 4 yards for heaviest materials, and on up to and including 6 yards capacity for the lighter materials. For smaller hauling and dumping jobs, the 2-yard unit which is mountable on a 1½-ton truck is highly efficient for long or short hauls.

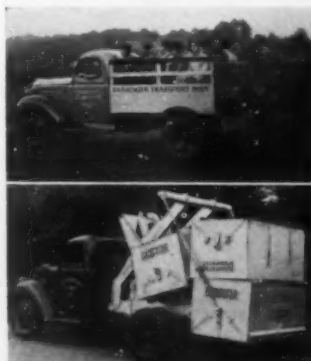
DEMPSTER-DUMPSTERS are at work in every section of

the country from New Hampshire to California and from Canada to South America . . . in both industrial and government projects. One truck with a Dumpster and 6 to 10 detachable containers will do the work of several trucks at a saving of 30% to 50% in cost. If you are thinking of bigger profits in 1940, use DEMPSTER-DUMPSTERS in your quarry operations, road construction, building jobs and other hand loading work.

No high pressure hose—  
No counterweight—  
No auxiliary jacks—  
Needed on DEMPSTER-DUMPSTERS.

Exclusive sales territory available for responsible dealers.

★ *PLUS—All these Additional Uses* ★



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KNOXVILLE  
TENNESSEE

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# COLMONOY



## Hard-Facing Alloys—for Tough Jobs

One pound of Colmonoy Sweat-On Paste outwore 10 pounds of ordinary hard-facing materials on this cement clinker plow. Photograph (unretouched) was taken after 1900 hours of operation in a Bradley Mill.

For maximum resistance to wear and corrosion, use Colmonoy. Easily applied. There's a grade for every job.

Write for Catalog

### WALL-COLMONOY CORPORATION

1067 W. GRAND BLVD., DETROIT, MICH.

Branch Offices at Buffalo, N. Y., Pittsburgh, Pa. (Millvale), Chicago, Ill., New York, N. Y., Whittier, Calif., Toronto, Ont., Windsor, Ont., Montreal, Que.

## STA-TRU

### Long-Mesh

## Woven Wire Screens

made to work under tension and vibration.

The straight stay-bars carry ALL the tension. The crimps in the round wires can not be stretched or broken. The screen can not be caused to sag or split by the pull of the tensioning device.

**LUDLOW-SAYLOR**  
WIRE CO. ST. LOUIS

## Classified Directory (Cont.)

### Measuring Devices

Blaw-Knox Co.  
Fuller Co.  
Hardinge Co., Inc.  
Jaeger Machin. Co.  
Schaffer Poidometer Co.

### Mill Liners

Columbia Steel Co. (U. S. Steel Corp. Subs.)  
Dixie Machy. Mfg. Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Rogers Iron Works Co.  
Smith, F. L. & Co.  
Traylor Engr. & Mfg. Co.

### Mill Parts

Blaw-Knox Co.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Smith, F. L. & Co.  
Traylor Engr. & Mfg. Co.

### Mills, Grinding (Ball, Compartment, Emery, Hammer, Pug, Rod, Roll, Tube, etc.) (See Pulverizers also)

American Pulverizer Co.  
Bradley Pulverizer Co.  
Brooks Equipment & Mfg. Co.  
Dixie Machinery Mfg. Co.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Jackson & Church Co.  
Jeffrey Mfg. Co.  
Lewistown Fdy. & Machy. Co.  
Pennsylvania Crusher Co.  
Raymond Pulverizer Div.  
Smith, F. L. & Co.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Williams Patent Crusher & Pulv. Co.

### Mortar Mixers

Eagle Iron Works  
Gruendler Crusher & Pulverizer Co.  
Jaeger Machine Co.  
Ransome Concrete Machinery Co.

### Nails

American Steel & Wire Co. (U. S. Steel Corp. Subs.)  
Columbia Steel Co. (U. S. Steel Corp. Subs.)

### Nozzles (Sand Blast)

Sly, W. W., Mfg. Co.

### Nozzles (Washing)

Link-Belt Co.

### Oil Burners

Smith, F. L. & Co.

### Oils (Cutting)

Texas Co., The

### Oils (Lubricating)

Bacon, Earle C., Inc.  
Gulf Refining Co.  
Robins Conveying Belt Co.  
Texas Co., The

### Outdoor Lighting Equipment

General Electric Co.

### Packers

Modern Valve Bag Co.  
Smith, F. L. & Co.

### Pallets (Steel & Wood)

Anchor Concrete Machy. Co.  
Bacon, Earle C., Inc.  
Besser Mfg. Co.  
Commercial Shearing & Stamping Co.  
Miner Foundry  
Multiplex Concrete Machy. Co.

### Pans, Grinding (Wet & Dry)

Eagle Iron Wks.  
Jackson & Church Co.  
McLanahan & Stone Corp.  
Traylor Engr. & Mfg. Co.

### Perforated Metal

Bacon, Earle C., Inc.  
Chicago Perforating Co.  
Cross Engineering Co.  
Gruendler Crusher & Pulverizer Co.  
Harrington & King Perf. Co.  
Hendrick Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Pioneer Engr. Wks., Inc.  
Robins Conveying Belt Co.  
Ryerson, Jos. T., & Son, Inc.  
Taylor-Wharton Iron & Steel Co.  
Traylor Engr. & Mfg. Co.

### Pinions

Bacon, Earle C., Inc.  
Frog, Switch & Mfg. Co., The  
General Electric Co.  
Jeffrey Mfg. Co., The  
Kensington Steel Co.  
Link-Belt Co.  
Taylor-Wharton Iron & Steel Co.

### Pipe

Frog, Switch & Mfg. Co., The  
Hetherington & Berner, Inc.

### Pipe Couplings

Ingersoll-Rand Co.

### Pipe Fittings

Hetherington & Berner, Inc.

### Pipe, Forms & Machine (Concrete)

Besser Mfg. Co.  
Universal Concrete Pipe Co.

### Plaster Mixers

Eagle Iron Works  
Gruendler Crusher & Pulverizer Co.  
Jaeger Machine Co.  
Ransome Concrete Machinery Co.

### Plaster Plants

Koehring Co.

### Poidometers

Schaffer Poidometer Co.

### Pontoons

Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Manitowoc Engineering Works

### Powder (Blasting)

Atlas Powder Co.  
Hercules Powder Co.

### Powder Magazines

Hercules Powder Co.

### Power Transmission Machinery

Diamond Iron Works, Inc.  
Gruendler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co., The  
Link-Belt Company  
Robins Conveying Belt Co.  
SKF Industries, Inc.  
Smith, F. L. & Co.  
Timken Roller Bearing Co.

### Power Units

Caterpillar Tractor Co.  
Nordberg Mfg. Co.

### Pulleys

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Gruendler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Robins Conveying Belt Co.

### Pulverizer Parts

American Pulv. Co.  
Dixie Machinery Mfg. Co.  
Frog, Switch & Mfg. Co.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Smith, F. L. & Co.

### Pulverizers (Hammer, Ring, Rod & Roll) (See also Mills & Crushers)

American Pulverizer Co.  
Austin-Western Road Machy. Co.  
Blaw-Knox Co.  
Bradley Pulverizer Co.  
Brooks Equipment & Mfg. Co.  
Columbia Steel Co. (U. S. Steel Corp. Subs.)  
Combustion Engr. Corp.  
Dixie Machy. Mfg. Co.  
Gay, Robert M. Div.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Pennsylvania Crusher Co.  
Raymond Pulverizer Div.  
Sturtevant Mill Co.  
Smith, F. L. & Co.  
Traylor Engr. & Mfg. Co.  
Universal Road Machinery Co.  
Williams Patent Crusher & Pulv. Co.

### Pumps (Diaphragm)

Hardinge Co., Inc.  
Jaeger Machine Co.

## Classified Directory (Cont.)

### Pump Valves (Dry Pulverized Material)

Fuller Co.

### Pumps (Dredge)

Bucyrus-Erie Co.  
Hetherington & Berner  
Ingersoll-Rand Co.

### Pumps (Dry Pulverized Material)

Fuller Co., The  
Ingersoll-Rand Co.  
Smidth, F. L. & Co.

### Pumps (Slurry)

Hardinge Co., Inc.  
Ingersoll-Rand Co.  
Smidth, F. L. & Co.  
Wilfley, A. R. & Sons, Inc.

### Pump, Slurry, Valves

Fuller Co., The  
Wilfley, A. R. & Sons, Inc.

### Pumps (Vacuum)

Fuller Co., The  
Gardner-Denver Co.  
Ingersoll-Rand Co.  
Smidth, F. L. & Co.

### Pumps (Water)

Gardner-Denver Co.  
Ingersoll-Rand Co.  
Jaeger Machine Co.

### Railway Equipment

General Electric Co.

### Railways (Electric)

General Electric Co.

### Refractories

General Electric Co.

### Recoverators

Manitowoc Engineering Works  
Traylor Engr. & Mfg. Co.

### Refractories

Smidth, F. L. & Co.

### Regulators (Voltage)

General Electric Co.

### Rewashers (Screw)

Eagle Iron Works  
Link-Belt Co.  
Smith Engr. Wks.

### Rheostats

Atlas Powder Co.  
General Electric Co.  
Hercules Powder Co.

### Roofing

Ryerson, Jos. T. & Son, Inc.  
Texas Co., The

### Sand Drags

Eagle Iron Works  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pioneer Engr. Wks.  
Rogers Iron Works Co.  
Smith Engr. Wks.

### Sand and Gravel Plants

Austin-Western Road Machy.  
Co., The  
Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pioneer Engr. Wks.  
Robins Conveying Belt Co.  
Traylor Engr. & Mfg. Co.

### Sand Lime Brick Machinery

Diamond Iron Works, Inc.  
Hardinge Co., Inc.  
Jackson & Church Co.  
Jeffrey Mfg. Co.

### Sand Separators

Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pioneer Engr. Wks., Inc.  
Simplicity Engineering Co.  
Smith Engineering Wks.

### Sand Settling Tanks

Eagle Iron Wks.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Nordberg Mfg. Co.  
Pioneer Engr. Wks.  
Smith Engr. Wks.

### Scales (Conveyor)

Merrick Scale Mfg. Co.

### Scales (Hopper)

Blaw-Knox Co.  
Merrick Scale Mfg. Co.

### Scales (Truck & Track)

Hardinge Co., Inc.

### Scrapers (Power Drag)

Austin-Western Rd. Machy.  
Co.  
Blaw-Knox Co.  
Bucyrus-Erie Co.  
Diamond Iron Works, Inc.  
Hayward Co., The  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Northwest Engineering Co.  
Pioneer Engr. Wks.  
Rogers Iron Works Co.  
Sauerman Bros.

### Scrapers (Wagon)

Bucyrus-Erie Co.

### Screen Cloth & Plates (Perforated)

Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Chicago Perforating Co.  
Cross Engineering Co.  
Gründler Crusher &  
Pulverizer Co.  
Harrington & King Perforat-  
ing Co.  
Hendrick Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Pioneer Engr. Wks.  
Robins Conveying Belt Co.  
Ryerson, Jos. T. & Son, Inc.  
Taylor-Wharton Iron & Steel  
Co.  
Traylor Engr. & Mfg. Co.  
Tyler, W. S., Co.

### Screen Parts

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Pioneer Engr. Wks.  
Screen Equipment Co.  
Traylor Engr. & Mfg. Co.

### Screens

Austin-Western Rd. Machy.  
Co.  
Bacon, Earle C., Inc.  
Chicago Perforating Co.  
Cleveland Wire Cloth & Mfg.  
Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Gründler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach.  
Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Nordberg Mfg. Co.  
Pioneer Engr. Wks.  
Robins Conveying Belt Co.  
Roebbing's, John A. Sons Co.  
Rogers Iron Works Co.  
Simplicity Engineering Co.  
Smith Engr. Wks.  
Sturtevant Mill Co.  
Traylor Engr. & Mfg. Co.  
Tyler, W. S., & Co.  
Universal Vibrating Screen  
Co.  
Williams Patent Crusher &  
Pulv. Co.

### Screens (Grizzly)

Austin-Western Rd. Machy.  
Co.  
Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Gay, Robert M. Div.  
Gründler Crusher &  
Pulverizer Co.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach. Co.  
Link-Belt Co.  
Pioneer Engr. Wks., Inc.  
Productive Equipment Corp.  
Robins Conveying Belt Co.  
Roebbing's, John A. Sons Co.  
Ross Screen & Feeder Co.  
Screen Equipment Co.  
Smith Engr. Wks.  
Traylor Engr. & Mfg. Co.  
Tyler, W. S., Co.  
Universal Road Machinery Co.  
Universal Vibrating Screen  
Co.



## PROVED on All Kinds of Screening Jobs!

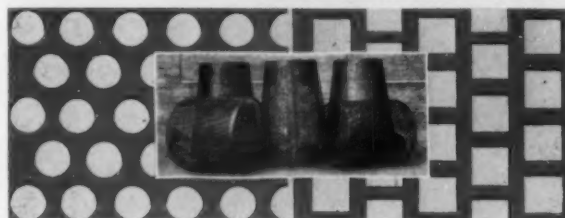
Link-Belt offers two general types of vibrating screens: (1) The "UP" unbalanced-pulley type for close sizing over comparatively small openings; (2) The "PD" positive drive type for larger screen openings and general heavy-duty service; both furnished in a range of sizes, single or double deck, with or without enclosures.

Consult Link-Belt engineers; Their recommendations are based upon years of experience in laboratory analysis and on all kinds of screening jobs.

LINK-BELT COMPANY, Philadelphia, Chicago, Indianapolis, Atlanta, San Francisco, Toronto. Offices in Principal Cities.

7891-B

## LINK-BELT Vibrating SCREENS



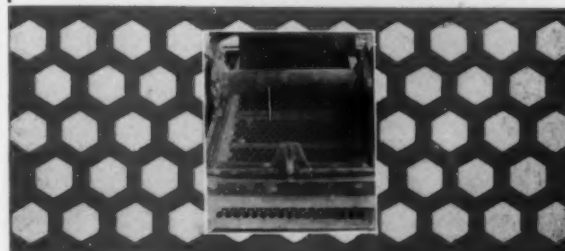
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Flextooth Crushers  
Pulverizers  
Shredders

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MINNEAPOLIS, MINNESOTA, U. S. A.

SCREENS  
CRUSHERS  
PORTABLE PLANTS  
CONVEYORS  
ELEVATORS  
LOADERS

## Classified Directory (Cont.)

### Screens (Laboratory)

Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Roebbing's John A., Sons Co.  
Smith, F. L., & Co.  
Tyler, W. S., Co.  
Williams Patent Crusher &  
Pulv. Co.

### Screens (Revolving)

Austin-Western Rd. Machy.  
Co.  
Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Gay, Robert M. Div.  
Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Parsons Engr. Corp.  
Robins Conveying Belt  
Roebbing's John A., Sons Co.  
Rogers Iron Works Co.  
Smith Engr. Wks.  
Traylor Engr. & Mfg. Co.  
Tyler, W. S., Co.  
Universal Road Machinery Co.

### Screens (Rotary)

Link-Belt Co.  
Smith Engr. Wks.

### Screens (Scalping)

McLanahan & Stone Corp.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Screen Equipment Co.  
Smith Engr. Wks.  
Williams Patent Crusher &  
Pulv. Co.

### Screens (Trommel)

Link-Belt Co.  
Traylor Engr. & Mfg. Co.

### Screens (Vibrating)

Austin-Western Road Mach-  
inery Co.  
Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Gruendler Crusher &  
Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewistown Fdry. & Mach.  
Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Nordberg Mfg. Co.  
Pioneer Engr. Wks., Inc.  
Robins Conveying Belt Co.  
Roebbing's John A., Sons Co.  
Rogers Iron Works Co.  
Screen Equipment Co.  
Simplicity Engineering Co.  
Smith Engr. Wks.  
Sturtevant Mill Co.  
Tyler, W. S., Co.  
Universal Vibrating Screen  
Co.  
Williams Patent Crusher &  
Pulv. Co.

### Screens (Washing)

Link-Belt Co.  
McLanahan & Stone Corp.  
Rogers Iron Works Co.  
Screen Equipment Co.

### Scrubbers (Washers)

Link-Belt Co.  
McLanahan & Stone Corp.  
Rogers Iron Works Co.  
Smith Engr. Wks.  
Tyler, W. S., Co.

### Seal Rings

Traylor Engr. & Mfg. Co.

### Separators (Abrasive)

Parsons Engr. Corp.

### Shafting

Bacon, Earle C., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Manitowoc Engineering Works

### Shale Planers

Eagle Iron Works

### Sheaves

American Steel & Wire Co.  
(U. S. Steel Corp. Subal.)  
Columbia Steel Co. (U. S.  
Steel Corp. Subal.)  
Diamond Iron Works, Inc.  
Eagle Iron Wks.  
Gruendler Crusher &  
Pulverizer Co.  
Hetherington & Berner  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pioneer Engr. Wks.  
Ransome Concrete Machinery  
Co.  
Roebbing's John A., Sons Co.  
Sauerma Bros.

### Shovel Repair Parts

(Manganese)  
Taylor-Wharton Iron & Steel  
Co.

### Shovels (Compressed Air)

Nordberg Mfg. Co.

### Shovels, Power (Diesel, Diesel- Air, Electric, Gasoline, Gas- Electric, Oil, Steam)

Austin-Western Rd. Machin-  
ery Co.  
Bucyrus-Erie Co.  
General Excavator Co.  
Koehring Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Speeder Corp.  
Manitowoc Engineering Works  
Marion Steam Shovel Co.  
Northwest Engineering Co.  
Thew Shovel Co.

### Shovels (Tractor)

Austin-Western Rd. Machy.  
Co.  
General Excavator Co.  
Koehring Co.  
Lima Locomotive Works, Inc.  
(Shovel & Crane Div.)  
Link-Belt Speeder Corp.

### Shovels (Truck)

Link-Belt Speeder Corp.  
Thew Shovel Co.

### Shovels (Underground)

Lima Loco. Wks., Inc.  
(Shovel & Crane Div.)  
Nordberg Mfg. Co.  
Thew Shovel Co.

### Shredders

Williams Patent Crusher &  
Pulv. Co.

### Sieves (Testing)

Hendrick Mfg. Co.  
Roebbing's John A., Sons Co.  
Smith, F. L., & Co.  
Tyler, W. S.

### Silos (Storage)

Blaw-Knox Co.  
Smith, F. L., & Co.

### Silo Stave Machines (Concrete)

Besser Mfg. Co.

### Skids

Besser Mfg. Co.

### Slakers (Rotary)

Traylor Engr. & Mfg. Co.

### Slugs (Grinding)

Smith, F. L., & Co.

### Slurry Mixers

Hardinge Co., Inc.  
Manitowoc Engineering Works  
Smith, F. L., & Co.

### Slurry Separators

Smith, F. L., & Co.

### Slurry Thickeners

Hardinge Co., Inc.  
Manitowoc Engineering Works  
Smith, F. L., & Co.  
Traylor Engr. & Mfg. Co.

### Smokestacks

Hendrick Mfg. Co.  
Manitowoc Engineering Works  
Traylor Engr. & Mfg. Co.

### Speed Reducers (Gear, etc.)

Bacon, Earle C., Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Smith, F. L., & Co.  
Traylor Engr. & Mfg. Co.

## Classified Directory (Cont.)

### Spouts

Gründler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Ransome Concrete Machinery Co.  
Traylor Engr. & Mfg. Co.

### Sprays & Spraying Equipment

Link-Belt Co.

### Sprockets

Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Kensington Steel Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Taylor-Wharton Iron & Steel Co.

### Stabilization Equipment

Barber-Greene Co.  
Besser Mfg. Co.  
Gründler Crusher & Pulverizer Co.  
Pioneer Engr. Wks.

### Standpipes

Ross Screen & Feeder Co.

### Steel (Abrasive-Resisting)

Ryerson, Jos. T., & Son, Inc.

### Steel (Electric Furnace)

Timken Roller Bearing Co.

### Steel (Open Hearth)

Taylor-Wharton Iron & Steel Co.  
Timken Roller Bearing Co.

### Steel (Special Alloy)

Chicago Steel Foundry Co.  
Timken Roller Bearing Co.

### Stakers

Combustion Engr. Co., Inc.  
Link-Belt Co.

### Storage Equipment

Barber-Greene Co.  
Blaw-Knox Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.  
Sauerman Bros., Inc.

### Strippers (Concrete)

Anchor Concrete Machinery Co.  
Multiplex Concrete Machinery Co.

### Switchboards

General Electric Co.

### Tachometers

General Electric Co.

### Tampers (Power & Hand)

Anchor Concrete Machinery Co.  
Besser Mfg. Co.  
Kent Machine Co.  
Multiplex Concrete Machinery Co.

### Tanks (Air, Storage, etc.)

Blaw-Knox Co.  
Combustion Engr. Co.  
Eagle Iron Wks.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Ingersoll-Rand Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Parsons Engr. Corp.  
Pioneer Engr. Wks.  
Raymond Pulv. Div.  
Traylor Engr. & Mfg. Co.

### Towers

Blaw-Knox Co.  
Eagle Iron Works  
Hendrick Mfg. Co.  
Jaeger Machine Co.  
Ransome Concrete Machinery Co.  
Robins Conveying Belt Co.  
Sauerman Bros., Inc.

### Track and Track Equipment

Besser Mfg. Co.  
Columbia Steel Co. (U. S. Steel Corp. Subs.)  
Nordberg Mfg. Co.  
Taylor-Wharton Iron & Steel Co.

### Track Shifters

Nordberg Mfg. Co.

### Track Systems (Overhead)

Jeffrey Mfg. Co.  
Link-Belt Co.

### Tractors

Caterpillar Tractor Co.  
Koehring Co.

### Tractors (Electric)

Link-Belt Co.

### Trailers (Industrial, Quarry)

Austin-Western Rd. Machinery Co.  
Iowa Mfg. Co.  
Koehring Co.  
Link-Belt Speeder Corp.

### Transformers

General Electric Co.

### Trench Hoes

Link-Belt Speeder Corp.

### Trucks (Agitator)

Blaw-Knox Co.  
Jaeger Machine Co.  
Smith, T. L., Co.

### Truck Bodies (Dump)

Commercial Shearing & Stamping Co.  
Dempster Bros.  
Hendrick Mfg. Co.

### Trucks (Diesel)

General Excavator Co.

### Trucks (Gas & Gas-Electric)

General Excavator Co.

### Trucks (Industrial)

Iowa Mfg. Co.

### Trucks (Mixer)

Blaw-Knox Co.  
Jaeger Machine Co.  
Ransome Concrete Machinery Co.  
Smith, T. L., Co.

### Tubing (Seamless Steel)

Timken Roller Bearing Co.

### Turbines

General Electric Co.

### Unloaders (Boat)

Link-Belt Co.

### Unloaders (Box Car)

Barber-Greene Co.  
Besser Mfg. Co.  
Diamond Iron Works, Inc.  
Fuller Co.  
Gay, Robert M. Div.  
Gründler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Universal Road Machinery Co.

### Unloaders (Car, Bin, Truck, etc.)

Barber-Greene Co.  
Bucyrus-Erie Co.  
Diamond Iron Works, Inc.  
Fuller Co.  
Gay, Robert M. Div.  
Gründler Crusher & Pulverizer Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Marion Steam Shovel Co.  
Northwest Engineering Co.  
Robins Conveying Belt Co.  
Universal Road Machinery Co.

### Unloaders (Pneumatic)

Fuller Co.

### Unloaders (Underground)

Diamond Iron Works, Inc.  
Jeffrey Mfg. Co.  
Nordberg Mfg. Co.

### Ventilating Apparatus

Blaw-Knox Co.  
Parsons Engr. Corp.

### Vibrators (Bin and Concrete Form)

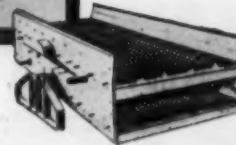
Besser Mfg. Co.  
Ingersoll-Rand Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Tyler, W. S., Co.

### Vibrating Screens

Austin-Western Rd. Machinery Co., The  
Bacon, Earle C., Inc.  
Brooks Equipment & Mfg. Co.  
Diamond Iron Works, Inc.  
Eagle Iron Works

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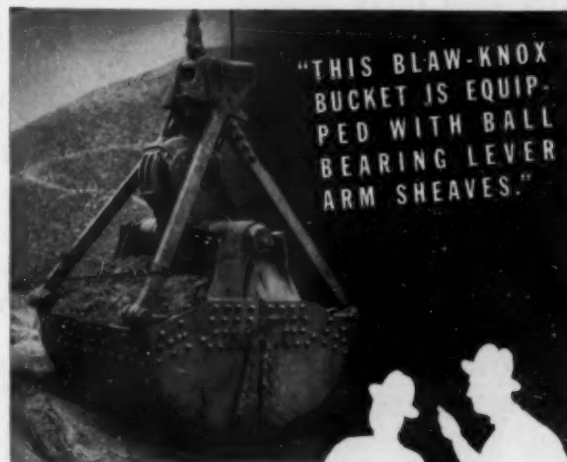
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KNOXVILLE, TENNESSEE

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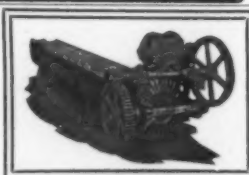
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Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Co.  
Nordberg Mfg. Co.  
Pioneer Engineering Wks.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Screen Equipment Co.  
Simplicity Engineering Co.  
Smith Engr. Wks.  
Sturtevant Mill Co.  
Tyler, W. S., Co.  
Universal Vibrating Screen Co.  
Williams Patent Crusher & Pulv. Co.

**Wagons (Dump)**  
Austin-Western Rd. Machy. Co.  
Blaw-Knox Co.  
Koehring Co.

**Washers (Log)**  
Diamond Iron Works, Inc.  
Eagle Iron Works  
Hardinge Co., Inc.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
McLanahan & Stone Corp.  
Pioneer Engr. Wks., Inc.  
Rogers Iron Works Co.  
Smith Engr. Wks.  
Traylor Engr. & Mfg. Co.

**Washers (Sand, Gravel & Stone)**  
Austin-Western Rd. Machy. Co.  
Bacon, Earle C., Inc.  
Diamond Iron Works, Inc.  
Gay, Robert M., Div.  
Gruendler Crusher & Pulverizer Co.  
Hardinge Co., Inc.  
Hendrick Mfg. Co.  
Iowa Mfg. Co.  
Jeffrey Mfg. Co.  
Lewiston Fdry. & Machy. Co.

Link-Belt Co.  
McLanahan & Stone Corp.  
Robins Conveying Belt Co.  
Rogers Iron Works Co.  
Roebbling's, John A., Sons Co.  
Smith, F. L., & Co.  
Smith Engr. Wks.  
Traylor Engr. & Mfg. Co.  
Tyler, W. S., Co.  
Universal Road Machinery Co.  
Universal Vibrating Screen Co.

**Weighing Equipment**  
Blaw-Knox Co.  
Fuller Co.  
Hardinge Co., Inc.  
Jaeger Machine Co.  
Merrick Scale Mfg. Co.  
Schaffer Poldometer Co.

**Welding and Cutting Equipment**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
General Electric Co.  
Hansome Concrete Machinery Co.  
Roebbling's, John A., Sons Co.  
Taylor-Wharton Iron & Steel Co.

**Welding Electrodes**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Taylor-Wharton Iron & Steel Co.

**Welding Rods**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Bradley Pulverizer Co.  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Roebbling's, John A., Sons Co.  
Ryerson, Jos. T., & Son, Inc.  
Taylor-Wharton Iron & Steel Co.

**Welding Wire**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Roebbling's, John A., Sons Co.  
Taylor-Wharton Iron & Steel Co.

**Winches**  
Ingersoll-Rand Co.  
Jeffrey Mfg. Co.  
Link-Belt Co.  
Robins Conveying Belt Co.

**Wire Cloth**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Bacon, Earle C., Inc.  
Cleveland Wire Cloth & Mfg. Co.  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Eagle Iron Works  
Leschen, A., & Sons Rope Co.  
Link-Belt Co.  
Ludlow-Saylor Wire Co.  
Pioneer Eng. Wks., Inc.  
Robins Conveying Belt Co.  
Roebbling's, John A., Sons Co.  
Screen Equipment Co.  
Taylor-Wharton Iron & Steel Co.  
Tyler, W. S., Co.  
Universal Vibrating Screen Co.

**Wire (Copper, Iron & Steel)**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
General Electric Co.  
Roebbling's, John A., Sons Co.

**Wire (Electric)**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
General Electric Co.  
Roebbling's, John A., Sons Co.

**Wire Rope**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons, Rope Co.  
Roebbling's, John A., Sons Co.

**Wire Rope Clips**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons  
Roebbling's, John A., Sons Co.

**Wire Rope Coatings**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)

**Wire Rope Fittings**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons, Rope Co.  
Roebbling's, John A., Sons Co.

**Wire Rope Hooks**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons, Rope Co.  
Roebbling's, John A., Sons Co.

**Wire Rope Lubricants**  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Roebbling's, John A., Sons Co.  
Texas Co., The

**Wire Rope Slings**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Leschen, A., & Sons, Rope Co.  
Roebbling's, John A., Sons

**Wire Rope Sockets**  
American Cable Co.  
American Steel & Wire Co. (U. S. Steel Corp. Subsl.)  
Columbia Steel Co. (U. S. Steel Corp. Subsl.)  
Hazard Wire Rope Co.  
Roebbling's, John A., Sons Co.  
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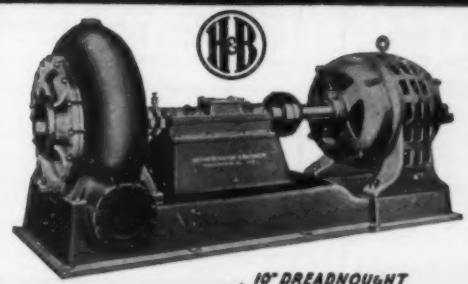
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MECHANICALLY AND  
ELECTRICALLY-VIBRATED



and Woven  
Wire Screen  
In all Meshes  
and Metals  
Scrubbers  
and  
Dryers

**THE W. S. TYLER COMPANY**  
3623 Superior Avenue Cleveland, Ohio

## Classified Advertisements

### Consolidated Offers

**JAW CRUSHERS:**  
1—24x36" Farrell, B15—new jaws. Used one month after complete rebuilding.  
2—3x36" Universal, reduction type. Can be set to  $\frac{1}{16}$ ".

1—42x48" Traylor Bull-dog.  
1—18x30" Allis-Chalmers.

**GYRATORY FINE REDUCTION CRUSHERS:**  
2—2" Symons Cones, fine bowls.  
2—No. 2F Telsmith, 32" dia. heads—to  $\frac{1}{16}$ ".  
1—No. 37 Kennedy Gearless, with spare shaft.  
1—4" Traylor, Type No. 410-TZ.  
1—3" Traylor, Type TZ.  
1—No. 25 Kennedy, vertical, motor driven.  
1—8" Traylor with bell head and non-choking concaves.  
1—10" Newhouse, with 100 H.P. motor.

**CRUSHING ROLLS:**  
7—Sets of 24" dia. x 14" Allis-Chalmers.  
1—Set of 20" x 14", Sturtevant, balanced type.  
1—Set of 36" x 16" Sturtevant.  
1—Set of 26" x 14" Allis-Chalmers.

**BELT CONVEYORS:**  
3—16" 35', 85', 160' c/c.  
1—18" 100' c/c.  
3—24" 80', 160', 210' c/c.  
All of these conveyors are equipped with Rex-Stearns anti-friction ball bearing troughing and return idlers. The 80' conveyor has a magnetic head pulley.

**VIBRATING SCREENS:**  
18—Tyler Hummers; 12—3' x 5', 4—4' x 5', all double deck; 3 x 5' triple deck; 4 x 5' triple deck. All of the steel enclosed type, with V-16 vibrators.  
1—Tyler Rotap Testing Screen, motor driven.  
5—Motor Generator Sets for operating Tyler Screens; 1 KW, 1½ KW, 2 KW, 6 KW.  
2—3' x 5' Leahy, single and double deck.  
5—4' x 7' Leahy, double deck, motor driven.  
4—3' x 6' Sturtevant M-V, double deck.  
1—4' x 8' Symons, 3-deck.  
3—3' x 10' Symons, 3-deck, motor driven.  
2—4' x 7' Traylor, 2-deck.

**RAYMOND PULVERIZERS:**  
3—No. 60 "Imp" type, each with air separator and direct connected 60 H.P., 3/60/440 volt, 1750 RPM. motor, also feeder motor.  
2—3-roll and 5-roll, High Side type, for fine separation.  
3—4-roll and 5-roll, Low Side type.  
8—Beater types; No. 0000, 00, 0, 1 and 3.  
2—No. 0000, with direct connected 10 H.P. motors.

**HARDINGE CONICAL BALL MILLS:**  
1—3' x 8" iron lined, worm gears, silent chain drive.  
2—4½' x 16", iron and sillex lined.  
1—5' x 22", iron lined.  
2—6' x 22", iron and sillex lined.  
1—7' x 22" Hardinge Conical Ball Mill, titanite lined, 28" trunnions.  
6—8' x 72", 12" herringbone gears, 20" trunnions, steel shells, steel heads, scoop feeders, railroad rail liners.  
3—8' x 18", 8" herr. gears, railroad rail liners.  
6—8' x 30", steel shells, 10" herr. gears, arranged for direct motor drive through flexible coupling; iron lined.  
2—8' x 30", same as above, but sillex lined.  
1—6' x 30", sillex lined, 8" herr. gears, 13" trunnions.

**INDIRECT HEAT ROTARY DRYERS:**  
3—4' x 35', 70' x 40', 80' x 65', all Type BV, made by L. R. Christie Co., Pittsburgh.

Refer to full page ad November issue for listings of several plants we are now liquidating, or write for detailed circular.

**CONSOLIDATED PRODUCTS CO., INC.**  
15-16-17 PARK ROW  
NEW YORK, N. Y.

**LATE MODEL**  
No. 25½ Kennedy Type S  
Reduction Crusher  
**BARGAIN**

Price and reasons for selling on request. Write Box 924, Care of Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

Welding Outfits, \$27.73 to \$36.56  
Acetylene Generators, \$60.00  
A. C. Electric Welders, \$49.68

**Superior Oxy-Acetylene  
Machine Co.**

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NEW RAILS—5000 tons—All Sections—All Sizes.  
RELAYING RAILS—25,000 tons—All Sections—All Sizes, practically as good as New.  
ACCESSORIES—New—Every Track Accessory carried in stock—Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates.  
Buy from One Source—Save Time and Money.  
Phone, Write or Wire  
**L. B. FOSTER COMPANY, Inc.**  
PITTSBURGH NEW YORK CHICAGO

**HYDRATORS**  
3 Kritzer & Schulteis Hydrators.

**AIR COMPRESSORS**  
BELTED: 335, 528, 676, 1000, 1300 & 1570 Ft.  
ELECTRIC: 478, 676, 807, 1202, 1722 & 2200 Ft.  
DIESEL: 608, 807 & 1000 Ft.

**PORTABLE GAS:** 110, 160, 220, 310, 540 & 1300 Ft.  
STEAM: 49, 510, 528, 1300, 2200 & 3000 Ft.

**CLAMSHELL BUCKETS, SKIPS & GRAPPLERS**  
Owen E & H Stone Grapplers.  
2 Yd. OWEN Type 2 Material Handling.  
1 1/2 Yd., 1 Yd. & 1/2 Yd. HAYWARD Class E.  
48 Steel Skips 6 1/2 x 6 x 2 1/2.  
5 Ton Bucyrus Rack Grabs.

**CRANES AND DRAGLINES**  
15-2 Yd. 5 Ton O & S 20 Ft. Boom Gas.  
12 Ton NORTHWEST 50 Ft. Boom Gas.  
25 Ton BROWNING & 30 Ton AMERICAN Loco.  
25 Ton LINK BELT K-48 Electric 70 Ft. Boom.

**CATERPILLAR SHOVELS**  
1/2 Yd. Bucyrus 10B Electric & 1/2 Yd. Nisley Gas.  
2 Yd. Marion Steam Shovel.  
1/2 Yd. 1 1/2 Yd. 2 Yd. & 4 Yd. MARION Electrics.  
1 Yd. NORTHWEST Gas.  
1 1/2 Yd. BUCYRUS 4B Steamer.  
4 Yd. Bucyrus 120B Electric. Also 3 yd. Erie Elec.

**DUMP CARS**  
46-KOPPEL 1 1/2 Yd. 24 & 30 In. Ga. V Shaped.  
15-2 Yd. 2 Yd., 4 Yd., 6 Yd., 12 Yd., 36 In. Ga.  
25-Tid. Ga. 12 Yd., 14 Yd., 20 Yd. & 30 Yd. Cap.  
15-Tid. Ga. 50 Ton Battleship Gondolas.

**FLAT CARS**  
9-50 ton std. ga. heavy duty flat cars.

**HOISTING ENGINES**  
Gas: 15, 30, 60, 100 & 120 HP.  
Electric: 30, 55, 80, 100 & 150 HP.  
Steam: 6 1/2 x 8, 7 x 10, 8 1/2 x 10, 10 x 12, 12 x 14.

**DIESEL UNITS**  
75, 90, 180, 240 HP P. M. Engines.  
110 HP Ingersoll Rand Engine.  
175 KVA Worthington 3/60/2300.  
275 KVA Fairbanks 3/60/2300.

**BALL, ROD AND TUBE MILLS**  
6 x 8 Pebble Mill & 5 x 5 Batch Mill.  
3' x 8" & 5' x 22" HARDINGE CON. Dry Ball Mill.  
3' x 28" HARDINGE CONICAL Wet Ball Mill.  
6' x 22" HARDINGE CONICAL Pebble Mill.  
8' x 22" HARDINGE CONICAL Ball or Pebble Mill.  
4 x 8, 6 x 6 & 10 x 20 Straight Ball Mills.  
4 x 16, 5 x 18 & 5 x 22 Tube Mills & 6' x 22".  
3 1/2 x 8 & 5 x 7 Air Sweep Tube Mills.  
2 x 1/2, 5 x 10 & 5 x 12 ROD MILLS.

**PULVERIZERS**  
JEFFERY 24x20 & 1 1/2 Sturtevant R.R.  
RAYMOND Auto. Pulverizer No. 6000, 8 & 3.  
RAYMOND 1mm Mills No. 1, 2 & 3.  
GRINDLER XXB Mill & Jay Bee No. 3 & 4.  
RAYMOND 4 & 5 ROLL MILLS & 5 ft. Chaser M.

**STEEL STORAGE TANKS**  
10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.

**MATERIAL BIN**  
116 Ton Blaw Knox 2 Comp.

**400 BARREL CEMENT BIN**  
400 Barrel Butler Portable Steel Cement Bin with  
Fuller automatic batcher & push button control.

**SEPARATORS AND COLLECTORS**  
Gayco 5 ft., 12 ft. and 14 ft. Separators.  
Type 360 8 1/2 x 24, 8 x 25 and 16 x 42 Dust Collectors.

**ROLL CRUSHERS**  
36 x 60 Fairmount & 36 x 16 Atlas Chalmers.

**JAW CRUSHERS**  
10 x 8, 13 x 7 1/2, 14 x 7, 15 x 9, 15 x 10, 16 x 9, 16 x 12, 16 x 10,  
18 x 11, 20 x 8, 20 x 8, 20 x 10, 20 x 12, 28 x 12, 30 x 15, 30 x 13,  
36 x 15, 36 x 20, 36 x 18, 36 x 14, 36 x 30, 36 x 30, 36 x 24,  
42 x 8, 48 x 45, 48 x 36, 60 x 45, 84 x 60, 84 x 16, 84 x 36.

**CONE & GYRATORY CRUSHERS**  
45 In. McCully Mammoth Gyratory.  
5 In. 10, 25, 37 & 48 Kennedy.  
18 In. 24 In. 30 In. 36 In. and 48 In. Symons Disc.  
4-10 T2 Traylor 4 ft. Gyratory.  
4-Nox. S. 3 & 6 Austin Gyratory.  
2-Traylor T-12 Bulldog Gyratory, also 16 inch.  
8 In. Traylor T7 Gyratory.  
17 Gates K-Nox. 2, 4, 6, 8, 7 1/2, 8 & 9 1/2.  
10 Inch Austin Model 105.  
12 & 13 Inch Superior McCully.

**SYNCHRONOUS MOTOR GENERATORS**  
100 K.W. RIDGWAY 3/60/2200-250-275 volt.  
1200 rpm.  
150 K.W. GEN. ELEC. 3/60/2200-250-275 v.  
1200 rpm.  
200 K.W. RIDGWAY 3/60/2200-250-275v. 900 rpm.

**SLIP RING MOTORS**  
55 H. P. GEN. ELEC. 3/60/440 v. 1200 rpm.  
(3) 100 H.P. GEN. ELEC. 3/60/440v. 900-1200 rpm.

**CONVEYOR PARTS**  
BELT: 1000 Ft. 60 In. 700 Ft. 40 In. 600 Ft. 36 In.,  
800 Ft. 30 In. 1042 Ft. 24 In. 517 Ft. 20 In.,  
297 Ft. 18 In. 500 Ft. 18 In. 300 Ft. 14 In.

**IDLERS:** 54 In. 42 In. 36 In. 30 In. 24 In. 20 In.  
18 In. 16 In. 14 In. & 14 In.

**Head & Tail—Pullers—Takeups for all sizes.**  
Steel Frames: 2,000 Ft. 24 In. 30 In. & 36 In. Sections.

**ROTARY DRYERS AND KILNS**  
36 In. x 20 Ft., 3 Ft. x 20 Ft., 4 Ft. x 20 Ft., 54 In.  
x 30 Ft. 42 In. x 24 Ft., 5 Ft. x 20 Ft., 5 Ft. x 16  
Ft., 5 Ft. x 10 Ft., 6 Ft. x 10 Ft., 6 Ft. x 20 Ft.,  
6 Ft. x 70 Ft.

**RUBBER HOSE**  
Air 1/2 to 1 1/2 In. Water 1 to 18 In.

**STEEL DERRICKS**  
GUY: 8 Ton 85 Ft. Boom, 15 Ton 100 Ft. Boom,  
20 Ton 115 Ft. Boom, 50 Ton 100 Ft. Boom.  
STIFF LEG: 5 Ton 70 Ft. Boom, 15 Ton 100 Ft.  
Boom, 55 Ton 100 Ft. Boom, 75 Ton 135 Ft. Boom.

**LOCOMOTIVES**  
GASOLINE: 3 Ton, 5 Ton, 8 Ton, 12, 14, and 30 Ton.  
STEAM: 5 Ton, 20 Ton, 40 Ton, 60 Ton & 80 Ton.  
ELECTRIC: 2 Ton, 5 Ton, 8 Ton, 49 Ton.

**SCREENS**  
VIBRATING: 2 x 4, 3 x 6, 12 x 8, 3 x 8, 3 x 5, 4 x 8,  
4 x 10, 4 x 7 1/2 & 4 x 12, 1, 2 & 3 Deck  
TITANTRAF, ROTEX, NIAGARA & RORINS.  
REVOLVING: 8 x 12, 8 x 14, 3 1/2 x 18, 8 x 24, 4 x 16, 4 x 20,  
4 x 28, 4 x 24, 5 x 30, 8 x 20, 8 x 20.

**R.C. STANHOPE, INC.**  
COMPLETE PLANTS BOUGHT AND SOLD  
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20 Ton Amer. Hoist & Derrick Crane, steam 1 1/2 Yd. No. 1115  
7" Newhouse Crusher ..... No. 6281  
Scalper Screen—72" x 12"—Galland Henning.  
Washing Screen—60" x 12"—Galland Henning.  
6" Fairbanks Morse pump—direct conn. 50 HP motor.  
10" CI pipe.  
Head and tail pulley assemblies—rollers and idlers.

150 HP Motor GE 220 V. 3 ph. 600 RPM  
50 HP Motor WEST 220 V. 3 ph. 1120 RPM  
50 HP Motor GE 220 V. 3 ph. 900 RPM  
50 HP Motor GE 220 V. 3 ph. 900 RPM  
30 HP Motor GE 220 V. 3 ph. 1800 RPM  
30 HP Motor GE 220 V. 3 ph. 720 RPM  
25 HP Motor GE 220 V. 3 ph. 720 RPM  
15 HP Motor GE 220 V. 3 ph. 1200 RPM  
15 HP Motor WEST 220 V. 3 ph. 460 RPM  
5 HP Motor GE 220 V. 3 ph. 1200 RPM  
5 HP Motor Atlas-Chal. 220 V. 3 ph. 1200 RPM

ALL SUBJECT TO PRIOR SALE

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623 NORTH SECOND STREET MILWAUKEE, WISCONSIN

## WE OFFER THE FOLLOWING STANDARD GAUGE SADDLE TANK LOCOMOTIVES

at Very Attractive Prices  
ALL THOROUGHLY  
RECONDITIONED

3-14x22 American 40 Ton  
1-15x22 Porter 40 Ton  
1-14x20 Porter 38 Ton  
1-14x20 Vulcan 38 Ton  
1-13x18 Porter 32 Ton  
1-12x18 American 25 Ton

Complete Stock List on Request

**BIRMINGHAM RAIL &  
LOCOMOTIVE CO.**  
BIRMINGHAM, ALA.

## Large Crushing Plant

66 x 84 — JAW CRUSHER

Secondary Crushers—Motors—Disc-  
crusher—Elec. Hoist—Conveyors—  
Elevators—Screens—Dust Collectors  
—Etc.

Box 913, Care of Rock Products, 309  
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## FOR SALE

2-Link-Belt dewatering elevators, 36" centers,  
complete with all steel supporting structure and  
drive machinery.  
2-Strut bar, revolving, scalping screens, 48"  
diameter, 12' long, with drive machinery.  
1-Saucerman, 2 cu. yd. capacity, slackline, electric  
hoist with 150 H.P. motor and starting equip-  
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Also contractors' equipment, "V" shaped and  
Western cars, 24 and 36-in. gauge, portable track,  
gas locos, frogs and switches. Attractive prices  
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## ELECTRICAL MACHINERY

Motors and Generators, A.C. and  
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New and Rebuilt. All fully guaran-  
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## DIESEL ENGINES FOR SALE

Fairbanks-Morse, most sizes up to 840 H.P.—  
High speed marine and stationary suitable for  
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1150 H.P. Also bargains in new engines. Give  
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**GENERAL DIESEL ENGINE CORP.**

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## DIESEL GENERATING PLANT

We recondition Diesel Oil Engines from  
10-1000 HP. Compressors, Contractors' Equip.  
At prices you can afford to pay—

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## VISIT US IN ST. LOUIS

1/2 yd. Northwest No. 3 Gas Shovel and Dragline,  
P & H 600 and 700 Cranes and Draglines,  
50B Bucyrus Erie Shovel, Crane, Dragline, A-1,  
40, 60, 120, 180, 240 HP Fairbanks and Atlas  
Diesel Units, and generators if required.  
300 and 300 KW Skinner Uniflow Generator Sets,  
150 HP Scotch Marine Type Boiler, Retubed.  
20, 25, 35 ton Plymouth Gasoline Locomotives.

All Sizes—Crushers—Shovels—Cranes—Com-  
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Hoists and Derricks.

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We solicit your Inquiries and Offerings

## SPECIALIZING IN—

JAW CRUSHERS  
GYRATORY CRUSHERS  
CRUSHING ROLLS  
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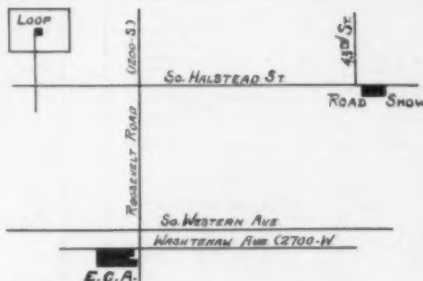
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CARS, BUCKETS, CRUSHERS, CONVEYORS,  
HOISTING EQUIPMENT, MOTORS, GENER-  
ATORS, HYDRAULIC WHEEL PRESSES  
**Buy, Sell, or Exchange**  
**Industrial Equipment Corp.**  
P. O. Box 1647 Warehouse  
Pittsburgh, Pa. Carnegie, Pa.

## For Sale

- 1 No. 8 Allis-Chalmers gyratory crusher.
- 1 No. 6 Allis-Chalmers gyratory crusher.

**M. S. ROSEN**  
P.O. Box 371, Albany, N. Y.

## FOR SALE

- 1—2½ Ton Plymouth Gasoline Locomotive 36" gauge.
  - 1—4 Ton Brookville Gasoline Locomotive 36" gauge, equipped with McCormick Deering International Engine.
  - 4—4 Yard All Steel Side Dump 36" gauge Koppel cars.
- All the above in excellent condition.  
Address Box 911, care of Rock Products,  
369 W. Jackson Blvd., Chicago, Illinois.

**FOR SALE—Surplus equipment—located seven miles from St. Louis**  
4' x 12' revolving screen.....\$150.00  
16" x 36" roller bearing jaw crusher ..... 900.00  
1½ yard shovel attachment for Lorain 75 ..... 750.00  
Smith Sand settling tank..... 200.00  
**CARRABINE SAND & GRAVEL CO.**  
Summit Ave. & Missouri-Pacific Tracks  
WEBSTER GROVE, MO.

36" x 200' Weller Belt Conveyor Equipment  
36" Link-Belt Self-Contained Apron Feeder  
30" x 225' Robins Belt Conveyor Equipment  
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24"x60' S-A. Conveyor Equipment, Ball-b's  
24" B-G. and Fairfield Plate Feeders  
20"x18" 14" 14" Belt Conveyors. In Stock  
24"x40' Cont. Bucket Elevator, On 2-chain  
18" Bucket Hauls Truck Loader, on Wheels  
14"x30' Link-Belt Encased Bucket Elevator  
14"x30' Jeffrey Open Type Bucket Elevator  
14"x30' Contin. Belt Bucket Open Elevator  
3—3"x38' Encased Belt Bucket Elevators  
Jaw Crushers—9x15, 12x18, 10x20 & 28x36  
Traylor 8" & Teismith 6H Gyratory Crushers  
28"x36" Corrugated Crushing Rolls, Geared  
15"x8" Jeffrey Swing Hammer Pulverizer  
30" wide Teismith Rotary Grizzly  
3x5 Multitrap 1-d. Dry or Wet Vibr. Screen  
3x6 Plat-O 1-d. Vib. Screen, with Motor  
2x6 Leahy 2-d. Vibrat. Screen, with Motor  
2—3x8 Link-Belt 1-deck Vibrat. Screens  
4x5 Hummer 1-deck Vibrating Screen, V-40  
120 New Screen Sections, 3x5 & 4x5 Sizes  
2 Robins Perfect 4x7 2-deck Shaker Screens  
Belted Air Compressors: 12" 44" 92" & 176  
2-drum Stroudsburg Builders Hoist, LeROI  
50 & 60-hp. Waukesha Engines, with Clutch  
11 New 24-g. Koppel Dump Cars, 1-yd. cap.  
Clamshell Buckets: ½, 1, 1½, & 2½-yd. cap.  
Barber-Greene No. 44 Trench Digger  
Cletrac Tractor No. 40 On Cuts., 6-cyl. eng.  
800-hp. Kelley Hot Water Feed Heater  
20' Overhead Traveling Crane, 5-ton cap.  
12 Centrifugal Electric and Belted Pumps

**G. A. UNVERZAGT**  
15 PARK ROW, NEW YORK CITY

No. 10, No. 40 Kennedy, 7" and No. 10 New-  
house, 8A, 8B, 10B & No. 32.  
Teismith, 36", No. 4 and No. 6 Traylor Gyratory  
Crushers.  
11x28 Champion, 12x24 Blake type, 14x24 Birds-  
boro.  
15x36", 24x72" and 60x84" Traylor Jaw Crushers.  
30x14", 40x15" & 54x24" Crushing Rolls.  
24x30" McLanahan Single Roll Crusher.  
16, 18, 19 & 21 ton ST Locomotives 36" ga.  
1 yd. Koppel—4 yd. Western 36" ga. Dump Cars.  
2T & 3W Monaghan Walker, Bucyrus Erie 3 & 5  
yd. Diesel Elec. Draglines  
90 HP Fairbanks Model 34B Diesel Engine.  
Vibrating Screens—all makes and sizes.  
Let us have your inquiries—Ask for Bulletin 47.  
**MID-CONTINENT EQUIPMENT CO.**  
710 Eastgate Pa. 2290 St. Louis, Mo.

- 1—¾ yd. McMyier Gas Crawler Crane.
- 2—Allen Settling Tanks, 6'0" and 7'0".
- 1—30' Gravel Washer, 50 Ton per hour capacity.
- 1—3 Drum Hoist.
- 1—Swintek Cutter, 50'.

**BROADWAY CONSTRUCTION CO.**  
4965 Valley View Road, Rt. 10  
CLEVELAND, OHIO

## CRUSHERS

**GYRATORY:** 42" McCully with 90% brand new parts. 36" Allis-C. 30" Super, McCully conv. to 16". Gates Nos. 10, 9, & 7½, 6, 5, 4, 3, 2, 1 (75 avail.) Teismith Nos. 4, 5, 6, 8C, 9 & 16. Also Many Austins, Kennedys and Traylor, many sizes.  
**JAW TYPE:** Traylor 60x84, 48x60, 42x48, 34x72, Superior 44x66 & 24x36. Buchanan 30x42. Farrel 60x42, 30x26, 24x36, 18x36, 12x24. Good Roads 1050. Acme 24x40. Misc. 7x12, 9x16, 8x20, 8x24, 12x24, 9x36, 9x30, 15x36.  
**REDUC. TYPE:** Kennedy Nos. 25, 27 & 40. Teismith S-F & 40. Traylor 36" T2, 8", 10", 12" Super, McCully 6" & 10". Newhouse 5, 7 & 10". Symons Cone & Disc Tr. 3' to 4'.  
**ROLLS:** Allis-C. 12½x12, 36x18, 40x15, 54x24 & 72x30. Fairmount 36x60 & Jeffrey 24x24 to 36x54 single roll. Cornish 36x14 & 42x16, Etc., Etc.  
**HAMMERMILLS:** Williams No. 1, 2, 3, 4, 5 & 9. Jeffrey 36x18 & 36x42. Day Nos. 30 & 40, Etc.  
**MILLS:** Kennedy Ball 4x8, 5x6 & 5x8. Marer 8x6 & 10x9. Hardinge 6'x3", 8'x30" & 6'x6". Misc. Tube Mills 5' & 6' x 22". Sturtevant Ring Roll, Raymonds, Kents, Fuller-Lehigh, Etc., Etc.  
**CRUSHING PLANTS:** No. 65 Diamond, No. 22 Pioneer 8x24, 1020 Good Roads, 9x40 Austin-Western, 9x36 C.H.

### MISCELLANEOUS ITEMS

Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryers, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kilns, Locomotives, Loaders, Motors, Pumps, Pumps, Rail, Scales, Screens, Slacklines, Shovel, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

**ALEXANDER T. McLEOD**  
7229 Rogers Avenue CHICAGO

Butler batching plant, 5 compts., cap. 105 yds. aggregate, 200 bbl. cement, weighing devices, elevator, conveyors, complete.  
225 bbl. Erie bulk cement plant, complete.  
155 bbl. Fuller cement bin, electric batcher.  
Blaw Knox 270 bbl. bulk cement plant, complete.  
72 ton Blaw Knox steel bin, portable, 2 compts.  
50 ton Blaw Knox steel bin, portable, 2 compts.  
Pumpecrete machines, Model 180, 190 & 200.  
Fuller Kinyon bulk cement unloader, portable.  
Fuller C50 rotary air compressor, electric.  
Gyratory crushers: K.V.R. 20, 37-B, 49; Telsmith 8A; Traylor 8"; McCully 13", 8", 6".  
Jaw: 6x12, 9x16, 10x20, 12x26, 13x30, 18x36, 24x36.

Jeffrey Type A 30" x 24" pulverizer.  
Robbins apron feeders, 18" x 6", 24" x 6".  
Traylor apron feeder, 5' x 15".  
Bucket elevator, 47', belt, buckets 24"x9"x11".  
Bucket elevator, 32' chain, buckets 8"x6"x12".  
Revolving screens, 72"x20", 72"x18", 60"x24".  
Robbins, 4x8 double deck Gyrex vib. screen.  
Whirley, 25 tons cap., 85' boom, electric.  
42-B Bucyrus Erie Diesel 2 yd. shovel.  
41-B Bucyrus Erie comb. crane and shovel. Steam.  
50-B Bucyrus Erie steam shovel.  
Browning 10 ton crane, gas, 40' boom.  
Universal 7 1/2 ton truck crane, Mack truck, pneumatic.

Hayward clamshell bucket, 1 yd. rehandling.  
Haise clamshell bucket, 1 1/2 yd. rehandling.  
Sauerman Crescent drag scraper bucket, 3/4 yd.  
Blaw Knox 1 cu. yd. dragline bucket.  
Barber Greene conveyor, 24"x200", complete.  
Barber Greene conveyor, 24"x70".  
8 Barber Greene conveyors, 24"x35", type N.  
Barber Greene conveyor, 18"x90".  
4 I. B. Wagon drills, FM-2, pneumatic tires.  
Complete stone washing plant. Write for details.  
I. B. Model 50 Leyner drill sharpener.  
Gas locomotives, 2 1/2 to 35 tons.  
Dredge pumps, 6", 8", 10", 12", 16".  
8"x26" cent. Lawrence pump, portable, 35HP., gas.  
8"x26" cent. Barnes pump, portable, 35 HP., gas.  
8"x25" Lawrence pump, 20 HP., electric.  
4"x12" cent. LaBour self priming pump, 15 HP., electric.  
Ing. Rand XCB-2 676 cu. ft. air compressor.  
Sullivan WJ-3 850 cu. ft. air compressor.  
DeWalt Woodworker, 18" circular saw, electric.  
Wodack "D" portable hand saw, circular, electric.  
Stiff leg derrick, steel, 30 tons, 97' boom.  
Steam hoist, 10"x12", 3 drums, Lidgerwood.  
Clyde 3 drum electric hoist and swinger, 75 HP.  
Lidgerwood, 2 drums, swinger, gas hoist, 75 HP.

**RICHARD P. WALSH**  
30 Church Street, New York, N. Y.

1-6 1/4-yd. Shovel—Bucyrus, 320-B Electric  
16-20-yd. Air Dump Cars, Magor, S.G.  
4-20-yd. Air Dump Cars, Koppel, S.G.  
36-5-yd. H. Dump Cars, Western, 36" Ga.  
1-55-ton Gas Electric Locomotive  
1-10" AMSCO Sand Pump  
2-700 to 1000 G.P.M. Water Pumps, direct driven by 3/60/2200 motors  
2-8x125' Rotary Kilns  
5-8x22' Allis Chalmers Tube Mills  
3-Gyratory Crushers, Austin No. 4, No. 6, No. 8  
9-50 H.P. & 25 H.P. Hoist Motors, 3/60/440 with controllers  
1-700 C.F.M. Steam I-R Compressor  
1-75 KW & 200 KW M.G. Set, 275 V., D.C.

**RAILS**—Relaying, all sections.  
**CARS**—Hopper, Ore, Gondola, Tank, Flat, etc.  
**LOCOMOTIVES**—All capacities and types. Freight car repair parts.

Send for our Complete Machinery List  
**Iron & Steel Products, Inc.**  
13492 So. Brainard Ave., Chicago, Ill.  
"Anything containing IRON or STEEL"

### IR Diesel Air Compressors

5-603 Cu. Ft. Ingersoll-Rand diesel engine driven, 2-stage air compressors. 100-125 lbs. air pressure. Modern heavy duty, type POC-2 complete equipment. Shop rebuilt. Ready for service. Will sell reasonable.

**R. GREENBERG**  
524 East 5th Street, New York City

### Partial Equipment List

C. R. Johnson 5 compt. bin 1000 c.y. automatic batchers.  
1—Bin 3 compt. 149 ton Johnson, weighing scales.  
15—Compressors 528'-2600' cap. Gas, Diesel.  
Electric drives, Stationary & Portable.  
21—Boilers—30 to 150 H.P. Vertical & Horizontal—High Pressure.  
60—Hoists: 1-2-3 drums, steam, gas & electric.  
5—Derricks—Steel Stiff Leg, 10-25 T. cap.  
12—Locomotives, 8-40 T. Gas, Steam, all gauges.  
30—Flat cars—38" gauge, 4 T. roller bearing.

Send us your inquiries  
Rail and Rail Supplies

### Coast to Coast Equipment Corp.

9 Rockefeller Plaza New York, N. Y.

### Synch. Motor Generators

750 KW WEST, 250 V., 2400 A.C., 900 RPM  
200 KW G.E., 250 V., 2300/4000 A.C., 1200 RPM  
200 KW G.E., 550 V., 2300/4000 A.C., 1200 RPM  
150 KW WEST, 250 V., 2300/4000 A.C., 1200 RPM  
100 KW G.E., 250 V., 2300 A.C., 1200 RPM

### Air Compressors

1302' I-R, PRE-2, Dir. Con. Syn. Mt. 440 V., 100 lb.  
1052' I-R XCB Belted Syn. Mt. 2200 V., 100 lb.  
1050' I-R, PRE-2, Dir. Con. Syn. Mt. 2300 V., 100 lb.

Each unit listed above is owned by us and is only a small part of our large stock, consisting of Synchronous Converters, Transformers, Motors, Coal Crushers, Wheel Presses and Trolley and Battery Locomotives.

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Incorporated Pittsburgh, Pa.  
502-F Grant Building

## USED SPEED REDUCERS

All Sizes - Types - Makes  
Conveying Equipment

### SAVE 60% OF NEW COSTS

All Materials Overhauled, Guaranteed  
SEND FOR OUR STOCK LISTS

### Patron Transmission Co.

154 GRAND ST. NEW YORK

### Complete

## WOODFORD ELECTRIC ORE HAULAGE SYSTEM

Including ten 10-cu. yd. standard gauge side-dump cars, double-motored; all necessary electrical control equipment; Motor-Generator Set; rails, etc.

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NEW YORK, N. Y.

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LOCOMOTIVE CRANE, gasoline operated—15-ton capacity—8 wheel, 40 or 50 ft. boom—Powered by Climax Mod. T gasoline engine. Also 7 1/2-ton Orton, gasoline, four wheel, locomotive crane. Electric Shovel, Industrial Brownhoist—3/4 yds. dipper mounted on cars. Electrical characteristics—3 ph.—40 cy. 440 volts.  
Truck Crane, Orton Crane & Shovel Co.—gasoline operated 1/2 yd. capacity. Mounted on Kelly Truck.

P. A. HENAU

2140 BOOK BLDG. DETROIT, MICH.

## FOR SALE

### USED EQUIPMENT

9x18 DIAMOND Roller Bearing Jaw Crusher.  
10x20 DIAMOND Roller Bearing Jaw Crusher.  
10x36 DIAMOND Roller Bearing Jaw Crusher.  
15x36 DIAMOND Roller Bearing Jaw Crusher.  
2'0"x4'0" Single Deck DIAMOND Vibrating Screen.

### NEW EQUIPMENT

1—DIAMOND 9x16 Bronze Bearing Jaw Crusher mounted on truck with 15-20 H.P. engine. Special price for quick sale.

**Diamond Iron Works, Inc., and  
Mahr Manufacturing Company Div.**  
Minneapolis, Minn.

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Shovels & Cranes  
Air Compressors & Tools  
Gas & Electric Pumps  
Bins & Batching Plants  
Tractors & Scrapers  
Rollers & Graders

Write us for prices, etc.

### SERVICE SUPPLY CORP.

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## TRUCK MIXERS

4-3 yard Rex Mixers on Mack Truck.

1-80 Ton—2 compartment Blaw Knox Bins.

Concrete Finishing Machine.

Rent a new Diesel 315 Compressor with new breakers or rock drills.

### The Jaeger Lembo Machine Corp.

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Corona, L. I., N. Y.

Electric Shovel—100-B. with Ward-Leonard control.  
Yard Cranes—Elec.-Gas-Diesel, 1/2 yd. & larger.  
Gas Loco. Cranes—7 1/2-20 tons. Steam—15-40 tons.  
Barber-Greene Loaders—No. 21 & 42. Also Haise.  
30' Coal Conveyor, crawler type, gas or electric.  
Sauerman Expt.—Hoists, Buckets—etc., 1/2 to 4 yd.  
Hammermills—Wms. Nos. 9-8-7-6-4-3. Jef. B 30x24.  
Crushers—48x60—24x48—24x36—18x24—15x30—12x24—9x16—8x12.  
Kilns—1-8'x80', 2-8'x125', 1-6'x50' cooler.  
Diesel-Gen. & motors, 125 KW, 250 volts DC.  
**JAMES WOOD, 53 W. Jackson, Chicago, Ill.**

### Used Equipment Wanted

### AIR COMPRESSOR WANTED

700 to 1000 CFM direct connected synchronous motor driven, 2300 volt, 100 lb., complete.

GEORGE M. MERIWETHER

606 Farley Bldg. Birmingham, Ala.

### WANTED

One No. 2 or No. 3 Northwest Shovel-Crane Combination. Eastern location, fair condition, state lowest price. Address Box 928, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

## Used Equipment Wanted

### WANTED

Used Tube Mill in good condition, size 5 ft. x 20 ft. or 5½ ft. x 22 ft. Also Air Separator 10 or 12 ft. Address reply to Box 927, Rock Products, 309 West Jackson Blvd., Chicago, Illinois.

### WANTED

Gas Shovel ¾ to ¾ yd. Must be in good condition. State lowest price, terms, age, and location.

Address Box 923, Rock Products  
309 West Jackson Blvd., Chicago, Illinois

### WANTED

A dryer for drying approximately 25 tons per hour minus ¾ inch limestone 5% moisture. Address Box 920, care of Rock Products, 309 W. Jackson Blvd., Chicago, Illinois.

## Consulting Engineers

D. C. Hoffman, Pres. L. H. Hoffman, Treas.

DIAMOND CORE DRILLING  
HOFFMAN BROS. DRILLING COMPANY  
PUNXSUTAWNEY PA.

We drill for any mineral. We have more than forty steam, electric and gasoline drills, adapted for any job. Satisfactory cores guaranteed. Our prices are right.  
Established 1882 . . . . . Telephone No. 382



### WE LOOK INTO THE EARTH

By using Diamond Core Drills. We drill for Limestone, Gypsum, Tale, Fire Clay, Coal and all other minerals.  
PENNSYLVANIA  
DRILLING CO.  
Drilling Contractors  
Pittsburgh, Pa.

### F. M. WELCH ENGINEERING SERVICE

Consulting Engineers Greenville, Ohio  
Designers of GRAVEL PLANTS for 30 years  
SMALL PLANTS to meet local conditions with flexibility, ample crushing, minimum labor, low first cost and maintenance.  
LARGE MODERN PLANTS for metropolitan areas.  
GROUND STORAGE Plants.  
OLD PLANTS modernized.  
CONSULTATION REPORTS

### H. J. BROWN CONSULTING ENGINEER

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Specializing in Gypsum Plants and in the Mining, Quarrying and Manufacture of Gypsum Products.

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Examinations  
Reports

Design  
Construction  
Supervision

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### MARBLE-DOLOMITE

**DOLOMITE:** One of the largest deposits of pure white and colored dolomite in this country and on the Pacific Coast. Several thousand acres. Proven quantity. Grade established. Produces various standard products including many colored terrazzo and art stone aggregates and high grade marbles. Operating successfully for years. All facilities and utilities in. Equipped. Operating lease about to expire. Any similar or related industry with an eye to future reserves or present sources of supply, or responsible individual

desirous of acquiring a substantial and potentially profitable property and business should communicate with me directly or through their disclosed representative. All negotiations must be positively confidential. An unusual situation and opportunity. Write or call on

### ARTHUR J. HUGHES

Attorney at Law

836 H. W. Hellman Building  
Los Angeles, California

### A LIME RECLAIMING CORPORATION LOCATED IN INDIANAPOLIS, INDIANA.

Offers a third interest in the corporation to the proper person who is able to invest \$5,000.00 and is capable of assisting in management and sale of the product. For details apply to J. S. Kaufman, 604 Guaranty Bldg., Indianapolis, Indiana.

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Up to 5000 Acres of Tennessee

PHOSPHATE LANDS

Mineral Rights or Fee Simple

BEST AND SAFEST PLACE TO INVEST  
IDLE MONEY

H. D. Ruhm

Columbia, Tenn.

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Rock crushing plant located at edge of Bakersfield city limits in the heart of California oilfields. Deposit sufficient to operate from 15 to 18 years. Plant has been operated for ten years always showing a profit. Sales for 1935 were approximately 100,000 tons of materials.

A. H. KARPE

Drawer H Station A Bakersfield, Calif.

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Sacrifice to settle Estate. Greely Quarry, at Russellville, Kentucky. Inexhaustible supply of hard, high-grade calcium carbonate Grade A stone. 30 foot face above crusher floor. Dump direct to large Primary. No Water. No Incline. 50 acres practically free of any over burden. Present plant and equipment consisting of No. 9 Primary, 1½ yard shovel, 25-ton crane, compressor, conveyors, elevators, cars, 14-car concrete tippie, unlimited ground storage. Cheap power, either electric or steam, affords most economical production of crushed, building, chemical, and Riprap stone, agricultural lime and chemical lime of any quarry in Southern and Western Kentucky. Unlimited sales possibilities throughout greater part of all Western Tennessee as well as Western Kentucky. Box No. 922, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

## Positions Vacant

EXPERIENCED ASSISTANT SUPERINTENDENT wanted for cement plant. Between 25 and 40 years of age with college education, executive ability and broad experience in heavy machinery, both electrical and mechanical. Address Box 926, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

WANTED: SALESMAN, PORTLAND Cement Territory radius 40 miles Harrisburg, Penna. Must know and can estimate for Concrete Road Contractors and personally acquainted with dealers. Box 929, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

## Positions Wanted

SUPERINTENDENT, NOW EMPLOYED, whose initiative, imagination and ambition have been profitable both before and during the depression, desires position with sand and gravel, crushed stone or non-metallic mineral producing company. Experience covers producing, selling, cost accounting and plant design and construction. 42 years old, married, good health, excellent references, member A. I. M. E. Available for interview. Prefer Southern United States. Address Box No. 925, Care of Rock Products, 309 West Jackson Blvd., Chicago, Ill.

AVAILABLE—SALESMANAGER, WITH a thorough knowledge of Manufacture and Sales of Lime and Limestone Products; Have sold to the Agricultural, Chemical, Industrial, and Building trade in major markets; Capable of increasing your business in present markets, as well as selling and promoting your products in new markets; Would also be interested in position of Plant managing and handling sales of small plant; Plant location immaterial. Address Box 916, care of Rock Products, 309 W. Jackson Blvd., Chicago, Illinois.

POSITION WANTED — SAND & Gravel Company as Production Mgr. or Supt. Mechanical & Civil Engineer. 20 year experience. Design, Construction & Operation. River or Land plants. Best reference. Address Box 919, Care of Rock Products, 309 W. Jackson Blvd., Chicago, Illinois.

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POSITIONS WANTED — POSITIONS VACANT. Set in six-point type. Minimum \$1.00 each insertion, payable in advance.

INFORMATION—Box numbers in care of our office. An advertising inch is measured vertically in one column. Three columns, 30 inches to the page.

CLASSIFIED—Displayed or undisplayed. Rate per column inch, \$5.00. Unless on contract basis, advertisements must be paid for in advance of insertion.

# OLD RELIABLE OWEN

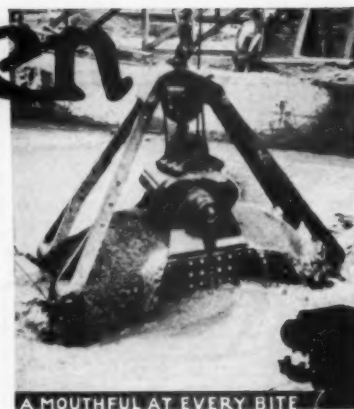
in COUNTLESS SAND and GRAVEL PITS

We're not exaggerating when we tell you "Old Reliable" OWEN is a byword amongst Crushed Stone, Sand and Gravel Producers everywhere. We can furnish a long list of satisfied users who'll gladly testify "It pays to Own an Owen." For performance sake with long life, why not let us furnish the proper bucket for your particular needs.

## THE OWEN BUCKET CO.

6040 BREAKWATER AVENUE, CLEVELAND, O.

BRANCHES: New York, Philadelphia, Chicago, Berkeley, Cal.



A MOUTHEUL AT EVERY BITE

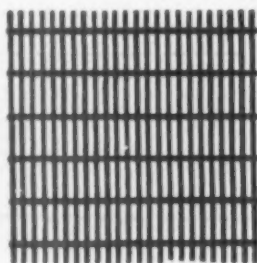
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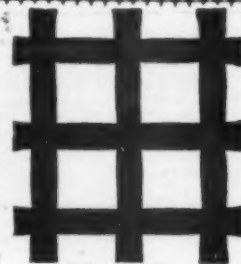


ALLOY  
No. 2

## STAR PERFORMERS

CLEVELAND SCREENS are star performers—returning larger capacities, increased profits and more accurate separations at lower cost. Cleveland Screens save money with the initial investment because, if they are made of the longer-wearing, wear-resisting ALLOY No. 2—Cleveland Screens stay on the job long after ordinary screens would have been replaced.

★ THE CLEVELAND WIRE CLOTH & MFG. CO. ★  
3574 E. 78TH STREET . . . . CLEVELAND, OHIO



2 Mesh .102 Ga.

MORE  
PROFITS  
FOR YOU

FROM THE DAILY REPORT OF A  
TIGER BRAND WIRE ROPE ENGINEER

Mr. Jenks is one of those "I'm from Missouri" fellows. For years he's been pooh-poohing the idea that there's any real difference between wire ropes. But today I was ready for him. And when he went into that old song of his: "You've got to show me," I whipped out an old piece of Excellay that I'd picked up out in the field. "There," I told him, "is a piece of Excellay that far surpassed the service of the last ordinary rope used." Mr. Jenks looked it all over, inch by inch. He could easily see it was still in pretty good shape. Then he smiled. "Okay," he said, "I see what you mean. Send us a 700 ft. length and I'll let you know how it works out."

Yours,

*al*

THEN I WHIPPED  
OUT AN OLD PIECE  
OF EXCELLAY



**EXCELLAY**  
*Preformed*  
**WIRE ROPE**

OUR engineers keep in constant touch with wire rope users in every industry. They believe that they can serve you best by seeing just how and where you use wire rope, taking down notes on how to prolong rope life so that they can give you money-saving tips. Whenever you're not fully satisfied with the performance of wire rope in any application, be sure to tell

one of these engineers about your problem. Circumstances, of course, govern how much can be accomplished to save you money through better wire rope performance, but of this you can be sure: The American Tiger Brand Wire Rope Engineer will not consider his job finished until he has solved to your satisfaction every problem involved in your use of wire rope.

**AMERICAN STEEL & WIRE COMPANY**

Cleveland, Chicago and New York

**COLUMBIA STEEL COMPANY**

San Francisco

United States Steel Export Company, New York



**UNITED STATES STEEL**

MORE *power* TO YOU

With the entire load in direct contact with the powerful Primacord-Bickford Detonating Fuse, every cartridge in the hole "goes" with the full force of a primer cartridge. And while the explosive wave of Primacord is practically instantaneous—over three miles a second—the fraction of time delay between holes and between rows of holes allows proper relief of burden. Better results are afforded with a minimum quantity of explosives, and savings are effected in loading, connecting holes, and removing the well-broken-up material.



## PRIMACORD-BICKFORD

### *Detonating* FUSE

**THE ENSIGN-BICKFORD CO., Simsbury, Conn.**

*Makers of Cordau-Bickford Detonating Fuse—and Safety Fuse since 1836*  
PB16

1. Tie through cartridge.

3. Connect main line lengths with square knot.

2. Half hitch branch to main line.

4. Fuse and cap on end of main line.



# *In Business for Your Safety*

AMERICAN CABLE

## TRU-LAY *Preformed* WIRE ROPE

### THE TRUE STORY OF A SLOGAN—

Most slogans for business organizations are coined phrases designed to help sell either merchandise or service. Our slogan, "*In Business for Your Safety*," voices this company's policy; this organization's spirit.

More than thirty years ago Weed Tire Chains were put on the market to make motoring safer. Thus the American Chain and Cable Company was conceived in Safety and has al-

ways been dedicated to that ideal. Today ACCO products are to be found serving faithfully and safely in nearly every field.

Fifteen years ago we introduced preformed wire rope—American Cable TRU-LAY. We did so not only because preforming made TRU-LAY a rope of longer service but—a safer rope. TRU-LAY Preformed is safer to handle; safer to use. The heritage of safety is a tradition with American Chain and Cable men. The entire organization stands as a single unit behind the true meaning of "*In Business for Your Safety*."

BUY ACCO QUALITY whether it is American Cable Wire Rope and Slings—American Chains (Weed Tire Chains, Welded and Weldless Chains)—Campbell Abrasive Cutting Machines—Ford Chain Blocks—Page Wire Fence—Page Welding Wire—Page Traffic Tape—Reading-Pratt & Cady Valves—or any other of the 137 ACCO Quality Products.

AMERICAN CABLE DIVISION • WILKES-BARRE, PENNSYLVANIA

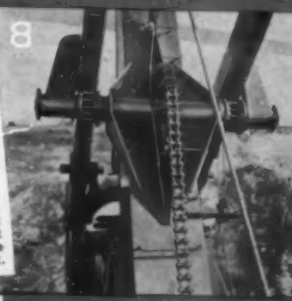
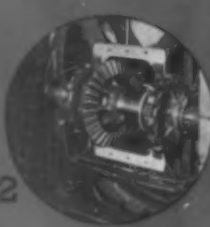
District Offices: Atlanta, Chicago, Detroit, Denver, Los Angeles,  
New York, Philadelphia, Pittsburgh, Houston, San Francisco



AMERICAN CHAIN & CABLE COMPANY, INC.

# THESE 54·8 FEATURES

*will make money for you*



- 1 Roller path, with double flanges to take both up and down loads from hooked cone rollers, is combined with truck frame for compact strength . . . internal swing rack . . . big, square axles give high clearance.
- 2 Single-shaft propeller, bevel gears enclosed in oil . . . chain drive . . . 4-position ratchet chocking dogs give free move-up without operator attention for either shovel or dragline.
- 3 Fast-digging dipper . . . long, sharp teeth, reversible and renewable . . . bowl smooth and tapered inside for quick dumping . . . ball does not obstruct top . . . curved door . . . extra-wide-spread handles with tubular torsion box.
- 4 Strong, simple main machinery . . . plenty of room to work in cab . . . variable diameter split drum laggings in oil . . . 236 h. p. diesel engine.
- 5 Revolutionary clutches . . . few parts, easy one-point adjustment that "stays put" . . . big cooling surfaces . . . inter-changeability of bands between swing clutches and between drum shaft clutches . . . operator has "feel" necessary for fast operation.
- 6 Six swing hook cone rollers give long range stability with less dead weight and eliminate center pintle . . . even load distribution . . . smooth, swift swing . . . no adjustments.
- 7 Easy operation . . . levers require exceptionally light pressure, give quick, accurate control . . . all operating levers easily accessible from seat . . . full vision of work at all times . . . comfortable, all-weather cab.
- 8 Single-chain crowd . . . one-point adjustment . . . easy removal for conversion to dragline . . . chain in center of boom, no side pull . . . powerful crowd-out and fast retract with dipper under full control at all times. Boom can be raised or lowered without affecting crowd chain adjustment.

# Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.



*Ships conveniently without major dismantling*